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The AUTOMOBILE

Bird's-eye view of an industrial city where the facilities for manufacturing, shipping and storing are combined—the buildings, yards and docks of the Bush Terminal Co.

Terminal City—A Triangle of Efficiency

Combines Facilities for Manufacturing, Storing and Shipping in One Huge Industrial Settlement

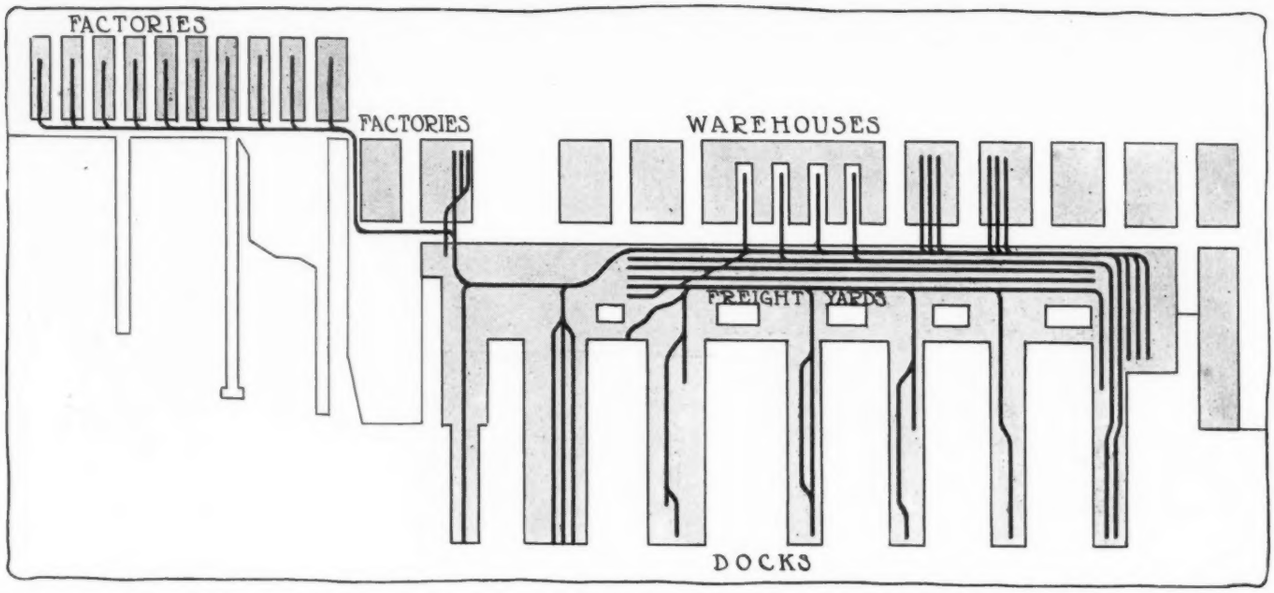
By J. Edward Schipper

THE operation of a manufacturing city along the lines of an office building is accomplished. It is not a looked-for desire but an actual business reality. True, such an industrial city occupies more than a city block—it is not one building but a dozen—yet the entire plant is governed through one administration. Renting space in such a city is much the same as renting a flat. You get heat, water and a dozen other service features thrown in. Your rent pays for floor space, heat, the use of the shipping facilities, fire protection, storage, etc.

As a manufacturer in such an industrial city you are relieved of factory cares, you are provided with power at a lower rate and a hundred and one other advantages are yours at a minimum cost.

Universal service for every manufacturer; one set of elevators arranged for the convenience of all the occupants of the huge buildings; a complete freight yard solely devoted to the use of the manufacturers; one set of motor trucks to convey the goods of all companies; one general shipping department to relieve the occupants of the bothers of routing their goods—all this is accomplished in the industrial city which is operated along the lines of a New York skyscraper.

Once the manufacturer has placed his goods in a packing case his responsibilities cease in the same manner as if he had placed a letter in a mail chute. He knows that the machinery of the city will place the goods upon an elevator, carry them to a loading platform and even place them on the car of a line which enters the territory to which he is ship-



Layout of the buildings, freight yards and docks of the terminal city designed to render quick shipping service to the occupants

ping. If he is shipping to a foreign country, the steamships which dock at the desired port also dock at the piers of this industrial city. His goods will find their way into the proper hold and across the seas to their destination.

Elasticity of Space

Should he be using 5,000 feet of manufacturing space and then suddenly through the securing of a large order desire to double or treble that amount, the space is there. His manufacturing elasticity is unbounded. He need not worry over the building of additions to his factory.

He need not bother about the space for the dead storage of his product, it is supplied. Enormous warehouses for the use of the city's manufacturers provide the space for the storage of his goods. It is not necessary to pay the same rent or the interest on the same invested capital for storage space as for manufacturing area. Overhead is cut to the bone, for the manufacturer need only pay for the space that he uses. He need only employ the number of men that he needs and he need not ship his goods through the traffic-laden streets of a metropolis.

The factory is at the terminal. The connecting link is removed and the chain connecting factory to purchaser is shortened. Attention is not distracted by the harrowing details of tracing freight shipments because the terminal city employs its own tracers and sees the cars safely on their way. Efficiency in handling manufactured products has now passed beyond the point where it merely applies while the material is passing through the plant. After an article has been made it is really not complete until it has been put into the hands of the user. If it costs too much in money or time to put the article into the users' hands, then the saving which has been effected by the use of efficient production methods is lost.

Three great problems beset the manufacturer. He must have space in which to manufacture, he must have efficient shipping facilities and he must have the space to store his goods whenever necessary. The highest degree of efficiency in the handling of the manufactured product is not attained until there is no lost time, money or motion.

Manufacturing

The most efficient manufacturing plant is that in which the floor space held by the manufacturer is just sufficient to meet his needs. He must be neither crowded nor must he have an excessive amount of room. But the quantity turned out by a factory varies from time to time in order to meet the demand. Therefore, in order to take care of the maximum condition and at the same time not to have too much dead space on the minimum, the factory space should be elastic. The efficiency factor in the manufacturing plant as far as space is concerned is in its elasticity.

Shipping

In shipping the utmost economy is obtained when the number of steps between the maker of the article and its user are a minimum. When the factory is at the railroad terminal this desired condition is obtained. When the manufacturer of an article is located in a large city, he has to depend on sending his goods through the city streets before he places them in the hands of the accredited agents of a railroad. He is subject to the delays of traffic, loading and unloading. The difference between first putting the goods on a truck and putting them directly on the freight car means thousands of dollars annually to a large manufacturer and for this reason many are obliged to forego the advantages of being near a good source of labor supply in order to be in a position to secure a railroad siding.

Storing

For a manufacturer to store his goods economically the warehouse must be near the factory. This will reduce the carrying charges between the factory and the warehouse. The storage place must also, for maximum economy, be at the shipping terminal because it must be possible to ship directly from the storing place without intermediate handling.

The only way in which these conditions can be met is in the concentration of the factory, warehouse and shipping terminal at one point. This proposition has been met in New York in this manner and has been taken advantage of by 200 manufacturers who have centered in a terminal city in which there is unlimited space for manufacturing and storing and which is at the same time a terminal shipping point for every railroad line that enters the city and for vessels which reach every country in the world.

Short cuts in routing goods through factories have resulted in the saving of thousands of dollars. The only reason that short cuts in the balance of the handling of goods have not been made is because they require an undertaking so vast that it is out of the power of any but the largest concerns. The idea of a terminal city in which a manufacturer can

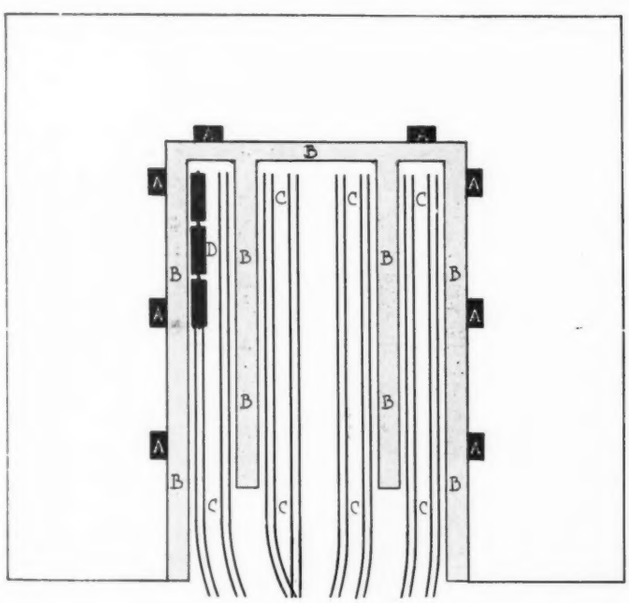
vary the amount of floor space he requires and at the same time be in close touch with storing and terminal facilities has solved the problem of cutting down overhead for these two hundred manufacturers and the same idea could be adopted in other cities.

By the construction of huge manufacturing buildings the greatest elasticity is given the manufacturer. He can quickly secure the space to meet his largest demands should they come suddenly. He can secure any amount of light and power at a cost that would be much lower than were he to secure it outside or were he to attempt to generate it himself. When the storage warehouses are close at hand no dead space has to be carried for the storing of goods and yet he can store as much or as little as he likes. There is at his disposal a flexible three-unit plant which responds to the touch of the throttle of demand in the same manner that a high-powered car leaps forward to meet the needs of the moment.

Overhead Expenses Cut

When selecting the location for an industrial plant broad consideration must be given to the problems of machinery, power, labor and all the factors that enter into the manufacture and marketing of the output. With the exception of high rents and difficulties in reaching good shipping facilities a large city offers big advantages in all of these. With the removal of these two objections an enormous cut in the overhead expenses of a city plant can be effected.

It is not surprising that the banding together for a number of manufacturers would result in the cutting of expenses for the individual. The same principle has been used in the purchase of other commodities than factory requirements. Housewives have found that where several came together and purchased in quantities much more advantageous prices have resulted. And in this instance where the plan was limited because of the few necessities required by every one involved in the plan it would not be limited in the instance of manufacturers because they all require space, light, heat, power, labor and shipping facilities. They all need room for future requirements and quick postal and telegraph service.



Plan view of the mammoth U-shaped factory buildings, showing how the elevators A communicate with the loading platforms B. The freight trains D can enter the enclosure and reach all parts of the building by means of the tracks C. There are frequent switchings and sidings to facilitate rapid handling of the cars

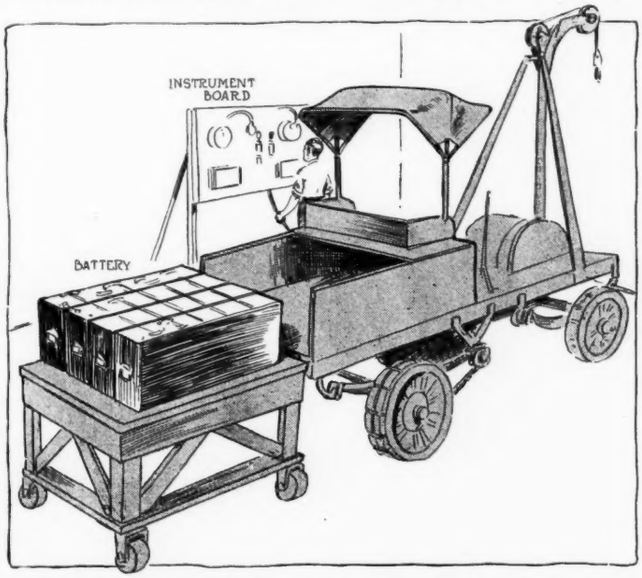
There is not one of these requirements which is not secured more cheaply if bought in large quantities and then distributed to the individual according to his needs. In the specific case of labor, the location of such a concentrated industrial plant within the limits of a large city puts every manufacturer in touch with an abundant supply of labor that will be much better trained to his particular class of work than that which he would find in the country.

New York is not alone however in the requirements of terminal service. About a year and a half ago, the Philadelphia Team Owners' Assn. brought an action before the Pennsylvania Railroad Commission looking to get improved conditions at the different freight terminals in that city. At the Convention of the National Team Owners' Assn. held in Minneapolis last June, the matter was brought up and it was decided to make the subject of congestion at terminals a national issue, and since that time the local associations in several of the large cities throughout the United States have petitioned the Interstate Commerce Commission to grant them relief.

Package freight moves through the New York terminals in quantity and variety greater than through any other terminals in the United States. This bears a direct relation to the population which aggregates more than 5,000,000 and to the extensive manufacturing and other industries which are only to be found in the first city of America. The physical handling of this freight presents a task so stupendous, that but for the doing of it men would say it were impossible. To cope with this situation, the freight terminals must be spread over a wide area, or else these terminals must be conducted with an efficiency of the highest order. The answer to this is a terminal such as the Bush Terminal in New York.

Community in Industry

Covering 250 acres of ground and embracing within this wide area the most modern facilities to meet each of these three great problems this gigantic terminal city stands as concrete evidence that the community principle can be carried to the heart of industrial questions. The enterprise stands alone and independent. The outside city streets need not carry so much as an ounce of the products of the 200 factories which are already represented within its broad expanse. The freight cars of every line in the country are in its yards, steamships which dock at every port on the globe



One of the utility battery crane trucks made use of at the terminal city, showing how it is relieved of its battery by means of a rolling table of the proper height. These battery crane trucks not only lift heavy loads but carry trains and trailers about the city yards

Specimen of steel reinforced concrete factory building at Bush Terminal. Tenant may have 140,000 square feet of space on one floor of this building

are moored to its huge piers. The employees and their families now supported by terminal represent a population of 50,000. The plant was organized in 1902 by Irving T. Bush to remove manufacturing from the crowded streets of Manhattan.

In meeting the three requirements of providing manufacturing space, shipping facilities and storage warehouses, the Bush Terminal Co. has planned for the future. Everything is done on so vast a scale that for some years it is impossible to foresee the present and proposed facilities outgrown. There are 5,000,000 square feet of floor space which can be utilized for manufacturing purposes. This space is contained in ten concrete and steel buildings and there is plenty of room for thirty more of these buildings of the same size. These will be built as they are needed. Eight of the buildings which now stand are six stories in height and the other two are eight stories.

The plant occupies a long rectangular space extending along the waters of the upper bay. It extends from 29th street South Brooklyn to 52nd street, a distance of 23 blocks in length and, neglecting the seven 1,400-foot piers which project from the rectangle like the prongs of a rake, it has a depth of two city blocks. It is located on the eastern shore of New York bay. A general idea of the shape of the plant and its relation to New York City is given on page 255.

One of the covered docks at Bush Terminal. Ships on one side deliver the freight, cars on other side move it to its destination without the use of the city streets

The fundamentals of success for a factory site are that it must be near the source of labor supply, it must be handy to the market for raw material and it must be able to reach the consumer at the lowest possible price and in the least possible time.

Labor Supply Unlimited

Within the 5-cent fare zone of the Bush Terminal there are 5,000,000 people. The supply of labor is unlimited. Ferries, elevated roads, subway and surface cars are handy and radiate in all directions from terminal plant like the veins of a leaf. Thus the home accommodations of those who labor at the terminal are practically without bound. Restaurants abound in the neighborhood and in one of the buildings one is provided at which good food can be secured at reasonable prices. There are five mail deliveries a day and there is a post office located in the plant.

A manufacturer can secure as much space as he needs. Subdivisions as low as 5,000 square feet can be arranged for and the rental is 30 cents per square foot for any but the top and ground floors on which the rental runs 35 cents a square foot. This rental price does not only mean that space is provided but in addition all the facilities of the terminal for heat, fire protection, elevator service, transportation service and watchmen are included.

In daytime there is no possibility of a want of light. The U-shaped buildings permit of light on every side as well as in the center and at night the electric current for lighting is supplied by the dynamos of the Bush company at little more than cost. The hot-water heat supplied by the plant in winter is sufficient to keep any room in any f the buildings at the desired temperature.

The fire protection is a big factor in the economy of the plant because it means reduced insurance. The rates are approximately 10 cents per $100 in the New England and Mutual companies and 20 cents per $100 in the line companies. It cost the terminal company $1,000,000 to install the fire protection system. There are 220 miles of piping leading to 225,000 sprinkler heads. The electric wiring totals a length of 175 miles. A force is maintained to inspect the fire alarm apparatus and maintain it at its highest efficiency at all times. When a fire breaks out the high temperature starts the water from the sprinkler head and at the same time automatically turns in an alarm which is responded to by the trained fire force. In a recent fire which occurred on one of the lower floors of a building, a number of girls located at the windows of the upper floors amused themselves by observing the crowd which had gathered below. This in spite of the fact that smoke was pouring

from the windows of the rooms in which the fire was burning.

Eight Automobile Firms

Eight manufacturers of automobile supplies and accessories have already made their headquarters in these buildings and scores of other industries which are here represented are closely allied to the automobile industry. The Eisemann magneto company has its plant here as have also the Emil Grossman Mfg. Co.; the Jones speedometer; New York and New Jersey Lubricant Co.; Oil Products Co.; Tagliabue Mfg. Co. maker of the well-known viscosity meters; Sears-Cross, manufacturer of speedometers, and the Wagner Electric Mfg. Co. Besides these there are manufacturers of all kinds of engineers' supplies, bolts, nuts, measuring instruments, etc.

Freight sidings and loading platforms surrounded by Bush factory

Shipping Arrangements

The moment a packing case leaves the door of the factory it is taken under the care of the Bush Terminal and the owner need have no further fears for its safe and speedy transmission. A Bush employee places the packing case on a Bush handtruck, wheels it to the elevator and loads it thereon. It is taken to the ground floor and carried to the loading platform by Bush men. The goods are then placed on a car of the line over which they are to be shipped. The car is then hauled by a Bush electric locomotive to the car floats and there the car is loaded on a Bush barge and carried to the proper railroad terminal and sent on its way. All this is without charge, being included in the rent.

Congestion of the city streets is absolutely avoided for the area of the Bush plant is so great that nothing like a jam of the streets occurs. There are eighty elevators at the disposal of the tenants, each is capable of 6,000 pounds and each has an area of 88 square feet, giving a total carrying capacity of 480,000 pounds per trip.

For carrying the freight cars about the yard there are six electric trolley engines and the 25 miles of track are so placed that there is not a point in the yard that cannot be easily reached. Frequent switches and sidings also help in the efficient handling of the transportation. Another factor in the efficiency of the handling of goods is in the use of four electric battery crane trucks. These tow trains of trailers and are not only useful for this work but in the actual lifting which is accomplished by the small crane attached to the front end of the truck. These trucks are inspected every noon and are ready for the men who operate them at the close of the lunch hour.

When the trucks are brought into the inspection and charging station at the noon hour they are lined up in the garage and a reading is taken on the ammeter to determine if the batteries still have a sufficient charge to last during the afternoon. By this system of two inspections a day these little units are maintained in a state of constant efficiency and perform a valuable work in the handling of goods about the yard.

Storage in 130 Warehouses

The cost of storage in the warehouses of the Bush terminal is a minimum on account of the small amount of handling required to get the goods in and out of the storage warehouses and on account of the vast space provided. There are 130 warehouses of various sizes. In these, goods of any nature can be taken care of and the cost will depend on the bulk and on the nature of the risk the company assumes in taking charge of them.

The warehouses are also of concrete and steel construction and in addition to the inherent fire-proof qualities of this type of building, the sprinkler system taps every nook and corner. The fire protection accorded the goods is complete in both curative and preventive measures. After a fire has broken out the automatic sprinkler and alarm and the watchman service combine to minimize its effects. Before the fire starts its possibilities are kept to the lowest possible degree by forbidding smoking anywhere within the limits of the yard and by careful sentry work on

Battery crane truck for handling light freight at Bush Terminal. Giant warehouse in background

From factory to destination—This series of illustrations shows how the packing case is taken in charge by the Bush Terminal Co., placed on one of the elevators, thence to a loading platform and into the freight train which finally carries it to the desired point, relieving the shipper of all anxiety

the part of the department in charge of the policing of the terminal.

Organization Is Complete

The internal arrangements of a plant of this size are as complete as those of a well-governed municipality. The wheels of industrial efficiency must not be clogged and at the present time the Bush company employs 2,000 men to see that they are not. The police and fire departments are trained to the minute and the adminstration organization made up of the heads of the various departments and the company officers eliminates the lost motion in the handling of the goods through the facilities of the yard by frequent meetings in which the interlocking duties of the departments are discussed.

The tenants of the Bush Terminal Co. are not the only ones who make use of the facilities for shipping which are found at its plant. Although the company operates its own railroad, primarily to facilitate the handling of freight about the terminal, there are still a number of other manufacturers who make use of it. There is a track delivery yard with a capacity of 200 cars for this business.

There are twenty steamship lines which now use the Bush terminal for berthing their vessels and besides being the accredited agents of these lines, the offices at the terminal are the American headquarters for many of the freight lines. Steamships are now docking at the piers at the rate of 750 a year and the large new double-decked pier, 1,400 feet long by 270 feet wide and 50 feet high, is the largest in the United States. It is to reach these facilities that outside concerns who are not tenants of the terminal make use of the yard service.

The social welfare side of this giant organization is not neglected. There is a garden for the children of the employees which is carefully inclosed by a high barbed wire fence to protect it from harm. In this the children are instructed in gardening. There is a loan organization from which employees can borrow at the rate of 6 per cent. annually for the purpose of meeting old debts, to purchase furniture, for illness, rent or vacation. In the last 3 years $3,000 has been loaned to 140 employees. The average loan is $20 and the maximum except in cases of extreme misfortune, is twice the weekly pay of the borrower.

Ten Departmental Heads

The administration consists of a president, four vice-presidents, secretary, treasurer and board of directors constituting the administration board. The departments of the plant are: finance, docks, warehouses, factory buildings, railroad yard, freight, floating equipment, legal, educational and social service. All are under specially qualified superintendents who are supreme in their respective spheres, subject only to orders from the administrative council. The legal department embraces a number of lawyers, one of them resident who looks after leases, claims, etc. The educational and social service are under directors. The former edits and publishes the plant's magazine, lectures before business bodies, handles advertising publicity, etc., and the latter department looks after welfare of employees and their children. The Bush Terminal Aid Society, with rooms in the Terminal Building, No. 19, is another feature of interest. There is a well-equipped meeting room, billiard and pool room and bowling alleys. The administrative board or council passes on everything of a business

Railroad yard at Bush Terminal, which accommodates 2,000 freight cars. Freight cars on float to be carried to proper railroad terminal

character. The police and fire departments come under jurisdiction of the plant superintendents.

Justifies Community Principle

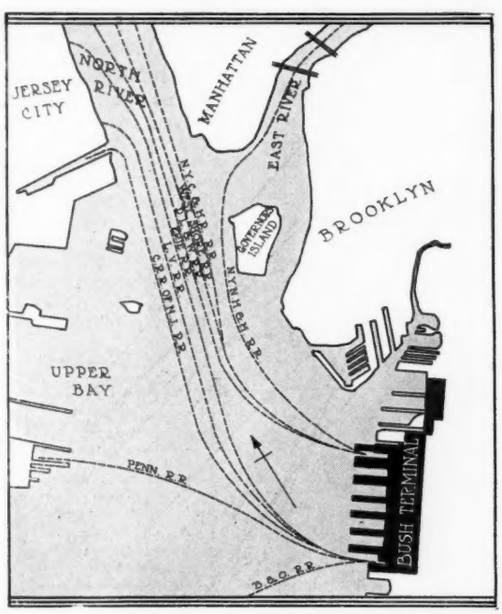
The terminal is only another adaptation of the community principle which has been advocated by students of political and social economy for decades. But it is a more sensible use of the principle than any of the so-called communities which have been founded on the principle of joint work. Here, there is no intermingling of those whose interests are not in common and each concern represented gives no more than a fair return for what it receives.

There is no support of the idle members of the community by those who labor more diligently, but there is a blending of interests in the cause of common efficiency which would not be possible with the detached scheme which this terminal replaces. The triangle is complete. It is an equilateral triangle, too, in every sense of the word, the requisites for each of the three branches, manufacturing, shipping and storing, being given their required amount of space without one overlapping the other. For, to what end would it be if the floor space and power for manufacturing were provided, and if, on the other hand, sufficient freight cars could not be accommodated to take away the products turned out?

The same applies to storing. With the 130 warehouses there is never a question of their being overtaxed. Goods can be kept at the temperature which they require to await the arrival of the steamship to bear them away or they can be kept at the warehouses indefinitely and there is plenty of room to accommodate the needs of the outside customers who make use of the facilities of the Bush terminal.

Bush Facts

¶ The Bush Terminal Co. is 14 years old.
It extends over an area of 250 acres.
It is located in South Brooklyn, N. Y.
There are now ten factory buildings.
Its industries support 50,000 people.
There will eventually be forty buildings.
¶ It has 5,000,000 square feet of factory space.
The buildings are all of concrete and steel.
There are seven 1400-foot piers now completed.
Within a 5-cent fare are 5,000,000 people.
In the yards there are 25 miles of track.
¶ It has a capacity of 2,000 standard freight cars.
It is protected by 220 miles of sprinkler pipe.
There are 225,000 sprinkler heads in the plant.
Electric automatic alarm wire totals 175 miles.
Steamships from its docks reach every port.
¶ There are 130 storage warehouses of all sizes.



Map showing the location of the Bush Terminal in relation to Manhattan and Brooklyn. The huge piers extend 1,400 feet into the waters of the upper bay, docking vessels from all ports

Hay Started Terminal

The history of the terminal is unique. Realizing the advantages of South Brooklyn for a terminal point because of its great natural marine advantages and because through its use the traffic congestion in the city streets would be avoided, the founder, Irving T. Bush, organized the terminal and then went out West and bought hay, ordering it to be sent to the Bush Terminal.

The railroads had never heard of this and refused to take the freight shipments for a while, but the orders to have hay shipped to the Bush Terminal continued, and finally the shipments were accepted. It is stated that Mr. Bush sold his hay at a profit.

After the shipments continued for a while the Bush company arranged with the railroad companies to operate its own barges, bringing to the railroad terminals freight consignments to be shipped over their lines.

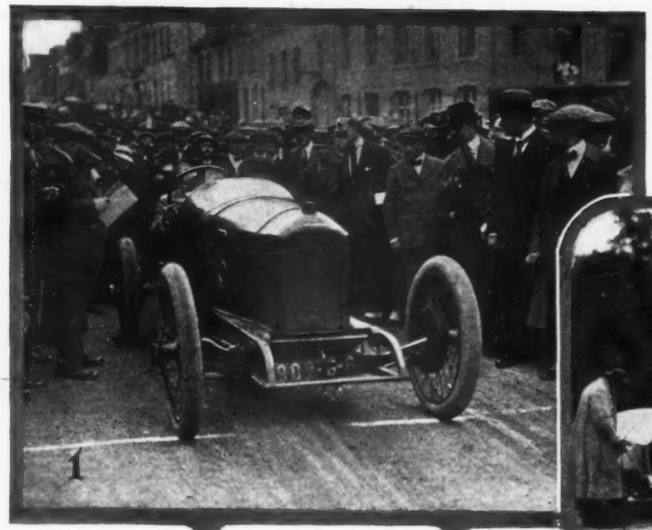
It was then but a step toward the promotion of the manufacturing and storing end of the business. These have kept pace with the shipping and the result has been a well-balanced plant.

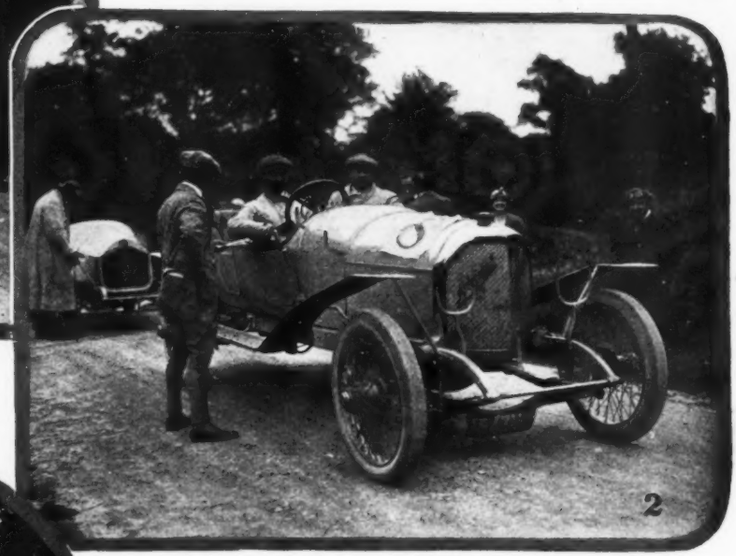
Room for Future Growth

In laying out the plant the future has been considered as well as the present. There is enough property owned by the enterprise to erect many times the buildings which are now standing and the docking and storing facilities will grow with the increase in factory space. The railroad yards, which are a complete system in themselves, can expand beyond the limits of the present plant to such an extent that no fears for the future are held by the terminal officers.

Grand Prix Peugeot

Attains This Average Sp





1—Grand Prix Peugeot starting the hillclimb at Boulogne
2—Vier in the Abadal, one of the fastest of the touring cars
3—Grand Prix Peugeot averaging 107½ miles per hour

BOULOGNE-SUR-MER, July 25—With a piston displacement of only 274.6 cubic inches, it has been possible to attain an average speed of 107 1-2 miles an hour over a 4.3 miles straightaway, the latter portion of this distance being covered at 112 miles an hour, to cover 3 kilometers standing at an average of 90.4 miles an hour, and to climb a mile hill, standing start, with several bends, in 1 minute 1-5 second. These performances were put up by one of the 274.6 cubic inch Grand Prix Peugeots which took part in the race at Lyons. It was the only car of its class in the meeting and naturally defeated all comers. In addition, it broke four year-old records held by the late Camille Jenatzy with a racing machine of 1,342 cubic inches piston displacement.

Knight-Motored Panhard Does Well

In the touring car section wonderfully good work was done by Panhard-Levassor, with Knight motor, which defeated all comers and bettered the racing car times with the exception of the Grand Prix Peugeot. Over the 1.86 mile course the average speed was 72.7 miles an hour, attained with a standing start. On the 4.34-mile course, flying start, the average was 82.5 miles an hour. The car is the Panhard-Levassor 35-horsepower model with a four cylinder Knight motor of 125 by 150 millimeters bore and stroke.

America was represented in this meeting by Johnny Aitkins, who drove a Rolls Royce touring car belonging to Charles Faroux. He finished fourth in the 4.34-mile trial.

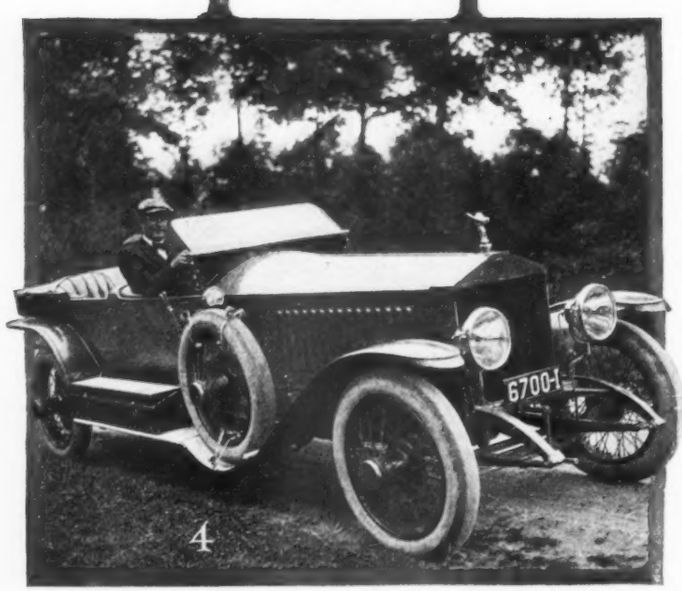
1.86 MILES STRAIGHTAWAY, STANDING START

Racing Machines

NO.	CAR	DRIVER	TIME
1	Peugeot	Boillot	1:14
2	Hispano-Suiza	Bertin	1:36 2-5
3	Hispano-Suiza	Cordier	1:47 4-5
4	Spa	Leduc	1:48
5	Gregoire	Stenne	2:04
6	Scar	Martin	2:06 3-5

Touring Cars

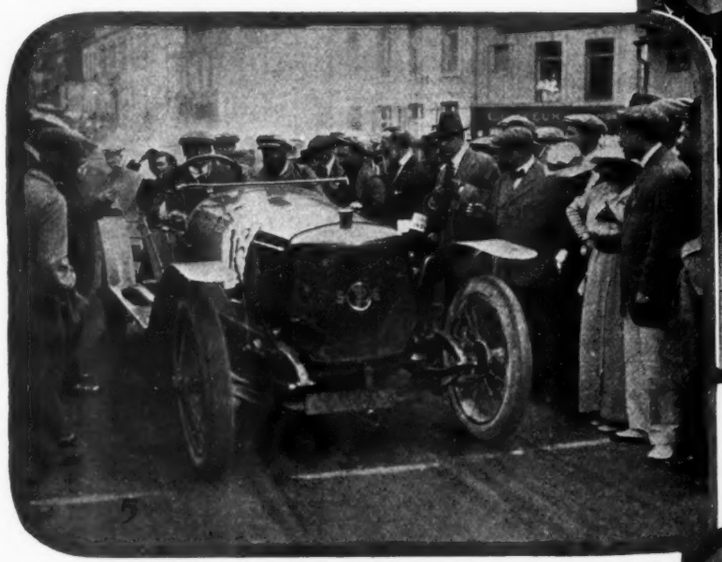
1	Panhard-Levassor	Artault	1:32
2	Panhard-Levassor	Thibault	1:53
3	Hispano-Suiza	Bara	1:40 3-5
4	Aquila-Italiana		1:48 2-5
5	Abadal	Vier	1:57 4-5
6	Hispano-Suiza	Delpierre	1:59 3-5
7	Rolls & Royce	Johnny Aitkins	2:00
8	Nagant	Wery	2:04
9	Darracq	Retif	2:12
10	Gregoire	Sauvage	2:13
11	Pierron	D'Avaray	2:28
12	Hupmobile	Deli	2:33

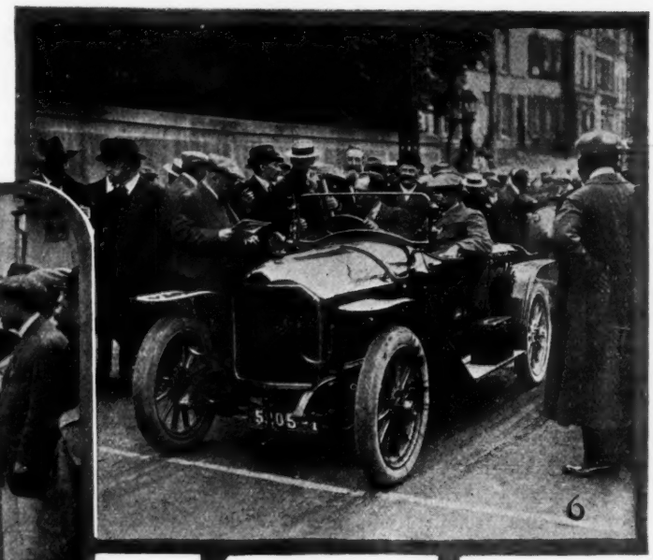


4—Johnny Aitkins on Rolls Royce owned by Charles Faroux, which won first prize in the elegance competition

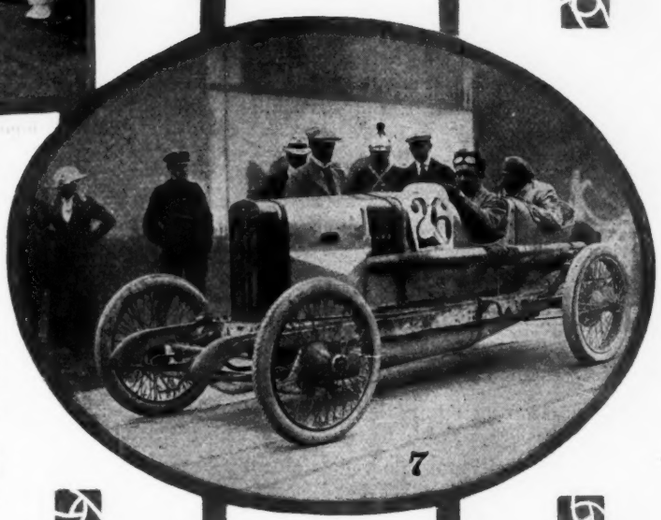
Makes 107½ M. P. H.

eed at Boulogne Races





5—Artault on Panhard-Levassor, the fastest of the touring cars
6—The small Pierron driven by D'Avaray starting in the hillclimb
7—Tandem seater Hispano Suiza, second fastest in racing section



4.34 MILES STRAIGHTAWAY, FLYING START

Racing Machines

1	Peugeot	Boillot	2:25 1-5
2	Spa	Leduc	3:42
3	Hispano-Suiza	Cordier	3:54 2-5
4	Hispano-Suiza	Bertin	4:00 4-5
5	D'Aoust	Hanriot	4:02 2-5
6	Aquila Italiana	Mollet	4:03 1-5
7	Zenia	Delattre	4:05 2-5
8	Gregoire	Stenne	4:48 4-5
9	Scat	Martin	4:50
10	Bugatti	Givelet	4:57 2-5

Touring Cars

1	Panhard-Levassor	Artault	3:09 4-5
2	Hispano-Suiza	Bara	3:28 4-5
3	Aquila-Italiana		3:48
4	Rolls & Royce	Johnny Aitkins	4:00 2-5
5	Hispano-Suiza	Delpierre	4:17
6	Panhard-Levassor	Thibault	4:22
7	Abadal	Vier	4:28 1-5
8	Nagant	Wery	4:29 1-5
9	Pierron	D'Avaray	5:33 1-5
10	Scat	Boutmy	5:48 3-5
11	Scat	Williame	6:35 1-5

MILE HILLCLIMB, STANDING START

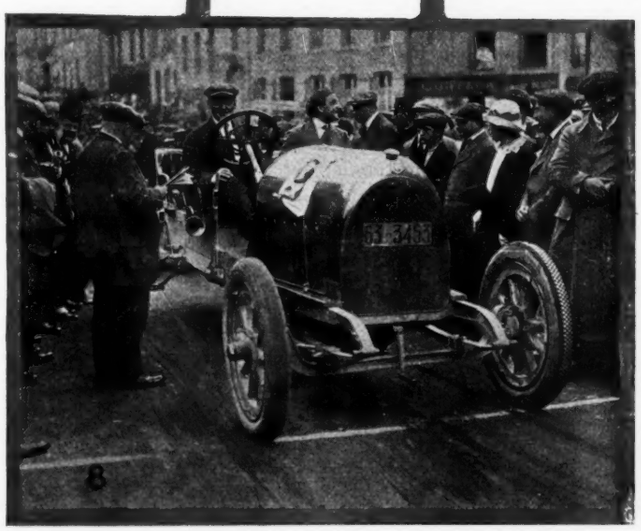
Racing Machines

1	Peugeot	Boillot	1:00 1-5
2	Hispano-Suiza	Bertin	1:18 2-5
3	Hispano-Suiza	Cordier	1:29 2-5
4	Spa	Leduc	1:31
5	D'Aoust	Hanriot	1:33
6	Aquila Italiana	Moliet	1:33 1-5
7	Zenia	Delattre	1:36 2-5
8	Bugatti	Givelet	1:38 3-5
9	Gregoire	Sienne	1:40 2-5
10	Scar	Martin	2:01 3-5

Touring Cars

1	Panhard-Levassor	Artault	1:16 1-5
2	Hispano-Suiza	Bara	1:20 2-5
3	Aquila-Italiana		1:29 3-5
4	Hispano-Suiza	Delpierre	1:35
5	Nagant	Wery	1:48
6	Darracq	Retif	1:50 3-5
7	Abadal	Vier	1:53 2-5
8	Gregoire	Stenne	2:02 2-5
9	Hupmobile	Dely	2:17 4-5
10	Scat	Boutmy	2:36 1-5
11	Pierron	D'Avaray	2:40
12	Sigma		2:44 3-5
13	Zedel	Bournigeaud	2:49 4-5
14	Scat	Williame	2:53 3-5

The French Grand Prix at Lyons did not allow the public to appreciate the speed possibilities of these new 274.6 cubic inch creations. The average of 65.5 miles an hour was alone looked at, the fact being lost sight of that the course was of such a winding nature as to make speed impossible.



8—Leduc on the Spa, one of the fastest of the racing cars in the competitions held at Boulogne-sur-Mer

Rapid Flame Propagation the Aim in Plug Location

The Automobile Engineers' Forum

F. E. Moskovics Takes Exception to Statements in "The Autocar"—Not a Matter of Number or Location of Plugs but of Raising Effective Pressure of the Cylinders as Rapidly as Possible

INDIANAPOLIS, IND.—Editor THE AUTOMOBILE:—In THE AUTOMOBILE for July 16, page 123, you give considerable prominence to a line of experiments and resultant curves by C. F. Dendy Marshall on the subject of location of spark plugs and the effect on power development; as reported in *The Autocar*. I read the report very carefully and was absolutely astounded at the results obtained until I reached practically the last part of the article in the paragraph headed Two Plugs are Unnecessary, where I find the little joker, which lies in the paragraph—"The engine I experimented with was of the fashionable type with all the valves on one side."

Flame Propagation Rapidity the Problem

Now, is it possible that a writer capable of attracting the technical attention of *The Autocar* should have to even experiment on a proposition of this sort. The matter is not one of spark plug location nor number of spark plugs, but the old, old problem of rapidity of flame propagation. It is so childlike in its simplicity, the principles involved are so elementary, that it hardly seems possible that they are not perfectly manifest to everyone in the profession.

Shape of Motor an Important Factor

Of course, locating two spark plugs over the valves of an L-head motor will make no appreciable difference, but placing them over the valves of a T-head motor would certainly make a great difference. Also, had Mr. Marshall made his experiments by placing his plug or plugs in the center of his cylinders rather than over the valves, he might have found some results which would have surprised him.

Center of Flame Area for Plug Location

We might refer him to the Sunbeam factory in England, which locates the single spark plug in the passage between the valve ports and the cylinder bore to get it as near as possible to the center of the flame area, or he might inquire of the various designers of the Knight motored cars, who locate their spark plugs directly in the center of their combustion chambers for the same reason and all of them have the single purpose of getting as rapid flame propagation as possible.

Raising Effective Pressure of Cylinders

The problem is so clear that it would seem at this late date it was unnecessary to again point out that it is not a matter of where the plug is located nor how many plugs are used so much as the fact that the result to be attained is that of raising the effective pressure of the cylinders as rapidly as possible and this certainly is accompanied by rapidity of flame propagation, and rapidity of flame propagation is accelerated by simultaneous ignition of the charge at points widely separated.

This also answers the last paragraph of the writer in which he says that "it seems that the double plug arrangement has much more effect when the valves are on opposite sides than when they are on the same." Then again he draws an erroneous conclusion when he says "owing probably to the two points of ignition being farther apart." I beg to say that there is no probability or question as to the reasons involved. It has been proven too often on the dynamometer, and the manograph clearly shows the increased pressure of the two-point ignition when the plugs are located as far apart as possible.

Symmetry of Firing Does Not Affect Power

The closing paragraph states he credits the advantage of two-point ignition on T-head motors "partly to the fact that the charge is symmetrically fired." I believe it is safe to say that the symmetry of the firing of the charge has absolutely nothing whatever to do with the increased pressure and the resultant increased power.—F. E. MOSKOVICS, Commercial Manager, Nordyke & Marmon Co.

Car of the Future Will Be Greatly Simplified

DETROIT, MICH.—Editor THE AUTOMOBILE:—The whole construction of the present day automobile (excepting perhaps the body and wheels), is rotten. I know I am stacking up against some pretty clever designers but tell me what has been done in the automobile as we now have it, outside of the perfection of details that was not in the little $650 Olds of the early 90s, or the big single-cylinder Winton of the same period. I will say there has been not one radical improvement or change.

Look back in the early stage of industry, when steam wore the crown and when Charles Duryea would argue with everyone that would argue with him that the internal combustion engine was the coming motor power. In those days Duryea, Olds and Alexander Winton were, you might say, the Master Minds. They are the ones who built the present automobile when it started.

Addition, Complication and Results

Since then we have added improvements, of course. We have also added cylinders, added gears, added magnetos, added expense, added complication, until it compares favorably with the first-class battleship, but always the same old machine. True, we get somewhat better results, but why wouldn't we? Haven't we been working on the same old thing long enough? And, haven't we added enough to get something?

The Car of the Future

Now let me tell you what the motor vehicle will be not 50 years hence but 25 years from now. You can call it imagination if you wish, a dream or a nightmare, but before

forming an opinion, think of the Atlantic cable, the telephone and wireless. The future truck will have for its foundation a chassis of standard design and measurement for the different sizes, say, 1,000, 2,000, 4,000, 6,000 and 10,000 pounds capacity. It will have standard springs and fittings. And will provide standard lugs and braces for the motor power. The power plant, I believe, will be operated by alcohol and perhaps it might be well here to give my reasons for such belief. It being a manufactured product, the quantity of which is unlimited, could be regulated to suit the demand. It is safer, cleaner and more agreeable to handle than either gasoline or kerosene and produces a more flexible explosion than either. And I might suggest that if the government would take up this matter of producing alcohol, instead of spending money in useless investigations, we would then get a price much less than that of gasoline at the present time.

The Real Self-Starter

The power plant, as I said, will have standard bosses or projections to fit lugs and braces of the chassis with but three or four bolt holes to fasten it to the same. It will be completely self-contained. The motor will be self-starting, in fact, not the so-called self-starter of today, where we depend on acetylene gas, electricity, compressed air, spring movements or some other form of power. This term, like many more on the automobile, is used for the want of something better. There are no self-starters today. They are auxiliary starters. Our future machine will have auxiliary powers but they will be reduced to two, compressed air and electricity. The acetylene gas generator and tank will have passed away and the only place you will find the water-circulating pump or a carbureter will be in a museum and referred to as Ancient Motor Group. I know there will be a general smile of criticism all along the line when I say that you will find the magneto and that spider-web piece of construction called a radiator in the same group. The motor of the future may be a modification of the Knight, but will not be as expensive in construction and will be much simpler. It will have no timing gears or camshafts.

Now let us see what we have under the hood. A plain symmetrically designed motor (and it won't be a two-cycle either) with no poppet valves or springs, no timing gears or chains, no cam or connecting link shafts, no circulating pump, no magneto, no wiring and no radiator. In addition to this, the motor being self-contained, can be removed for repair or replaced for a new one in less than 1 hour by the driver or an ordinary mechanic.

The Things We Won't Need

Listen, did I hear someone say, this fellow has forgotten about his drive shaft connections, and universal joints? No, but you forget that we are 25 years older and have learned that we don't need any. Not even a clutch, and about that box, filled with chrome nickel steel with more or less grease and trouble mixed in, well you'll probably find that in the same museum with the motor group, but indexed as Ancient Transmission Group. When we have gone this far, we can naturally disregard the gearshifting mechanism, including levers, etc.

Independent Drive for Each Wheel

Now let's get back to the thing that won't drive when one wheel slips, commonly called the differential. We will have to get something here that will give us the results we require and the only way is to drive each wheel independently.

But how? Now we have three methods, bevel or worm gear, chain and internal gear. By the time we have the rest of this car worked out, I guess we will have decided that the internal gear is the thing. And then we shall have a standard size gear bolted to the wheel, with standard size pinions suitable for each chassis of given capacity. Somebody else said I've forgotten the steering gear. No, I haven't. That answers pretty well now, so we will continue to use it.

The Results Will Follow

Now, in going over the above, it will be noticed that I have not attempted to suggest how any of the results are accomplished. But I do wish to say that I have my own ideas and know they are more possible than I would have believed the phonograph was, 30 years ago, or wireless telegraphy, 20 years ago.

Just as soon as the present automobile momentum dies out, someone will have made enough money to spend some of it in giving us what we really want.—WILLIS A. SWAN.

High-Grade, Costly Cars Will Always Have a Field

DESPITE persistent reports of psychological depression in business, the automobile industry continues at a steady pace along the high road of prosperity. To accentuate the contradiction, it is pointed out that conspicuous examples of increased business are found in the field of high-priced cars, possession of which might be regarded as a luxury.

$7,000,000 Sales in 6 Months

During the first 6 months of the calendar year 1914, the Packard company, for example, has established one of the biggest sales records in the annals of that successful concern. During this period, the company's net sales totaled, in round numbers, $7,000,000 and the output of cars was utterly inadequate to supply the demand.

In explanation of these conditions, Alvan Macauley, vice-president and general manager of the Packard company, made the following statement:

"The manufacture and sales of automobiles is perhaps the only specialty business in which every man, woman and child in the United States feels a deep and personal interest. Everyone who hasn't an automobile hopes some day to have one. Those who fortunately own a car are looking forward to the time when they can have a new and better machine.

"The automobile business has been described as the greatest self-advertising business the world has ever known. The entire people are interested, not only in having an automobile, but in having the most up-to-date one their purse will allow. I have been greatly impressed by the eagerness with which the school-boy studies the features of the various cars and promptly forms his own opinion of the various new models as they appear.

"The American tendency is to buy what is most desirable, with the cost as a secondary consideration. Also, there is a noticeable tendency toward keener appreciation of style and luxury in automobiles. Every car manufacturer appreciates the force of this awakening, and is catering to it in so far as the selling price of his product will permit.

Always a Class Putting Quality First

"The field for cars presenting the happy combination of beauty in line, luxurious riding quality, and extraordinary service quality is a distinctive one. There always will be that class which demands the last word in workmanship and design, putting quality first and then seeking the best value to be found in that particular field."

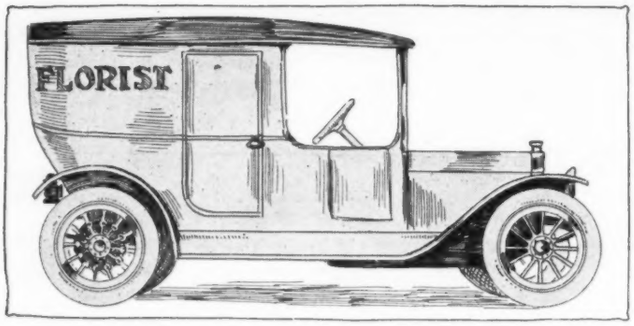


Fig. 1—Limousine converted into delivery wagon

The Rostrum

Suggests Making Old Limousines Into Delivery Wagons

EDITOR THE AUTOMOBILE:—A partial solution of the second hand car problem, is to use the closed cars that have fallen into the discard as delivery wagons. The change is easily and inexpensively made and the result is very pleasing. The delivery wagon-limousine as shown by Fig. 1, is well adapted to many lines of work. It makes an excellent vehicle for florists, dry goods merchants, confectioners and the like.

In making the change, it is merely necessary to remove the rear seat and arrange suitable shelves around the interior. Then, the windows are replaced by mirrors or these spaces are closed up entirely. In either case the cost is not great.

Watertown, N. Y. J. S. S.

Information on Regrinding Cylinders

Editor THE AUTOMOBILE:—1—I am contemplating having the cylinders of my Metz 1913 motor reground and new pistons with Leak-Proof rings fitted. Will you kindly advise me as to how much clearance I should allow between piston and cylinders? Should the pistons be the same size, the whole of their length, or smaller at the top end to allow for greater expansion?

2—Will it be necessary to get oversized rings if Leak-Proof rings are used?

Worcester, Mass. W. C. WHITTUM.

—1—With a motor of this size and speed, the clearance at the lower end should be .006-inch and should taper so that at the upper end the clearance is .012. For a high speed motor of this size the clearance should vary from .009 at the bottom to .015 at the top. In general .00125 inches clearance should be added for each inch of bore.

Whether oversize rings should be used depends on how much larger the cylinders are made. It would be best to determine what size the cylinders are to be and order the rings accordingly.

2—In reboring the cylinders it would be best to follow the S. A. E. standard as you can then probably get pistons to fit the cylinders exactly without any machining. It is recommended that the cylinders be ground .01, .02, .03 or .04 inches large.

How to Adjust Steering Gear

Editor THE AUTOMOBILE:—I have a Staver car, Model 35F in its fourth year:

1—Where are the various adjustments for the steering gear? Will you please designate each one's purpose?

2—Is there any method of preventing screeching of brakes? The leather is very little worn.

3—What is the bore and stroke of this engine?

4—Upon the opening of a petcock in a four-cycle engine for the purpose of determining the number of revolutions, does each report indicate two revolutions?

Minneapolis, Minn. E. F. BORUSKE.

—1—We are unable to give you exact information on this point because we have no photograph or drawing of the steering gear on this particular model and as the Staver is no longer manufactured there is no ready means of obtaining this information.

However, general instructions on the adjustment of the steering mechanism should be sufficient for you to remedy any fault. The steering mechanism is shown in principle in Fig. 2.

Jack up the front wheels, so that all parts of the steering mechanism may be moved freely. Turn the wheel back and forth and note whether there is any play in the gears. The adjustment of these gears varies on different cars but a careful inspection of the steering gear and a little experiment housing should reveal how to take up the play. As a rule the adjustment takes the form of a nut located at the base of the steering column, just at the point where it goes into the housing. By turning this nut the wear is compensated for. There is generally some sort of a locking device for this nut, which must be loosened up before the nut is turned. Be careful not to adjust the gear so tightly that it binds, but just enough to remove all play.

If the gears are so badly worn that the play cannot be fully removed it will be necessary to replace them unless the steering gear is a worm and gear type in which case the steering connections can be loosened and the wheel rotated until the worm meshes with a new segment of the wheel.

Next, examine the steering rod, and if there is any play in the ball joints at the ends this should be removed by adjusting them. By referring to the figure it will be seen that the outer end of each socket consists of a cap threaded into the steering rod and by turning up on this member the play between the ball and the socket is removed.

Note whether the pins or bushings holding the tie-rod are worn and if they are they should be replaced. Also see that the wheel bearings are in adjustment and that the king pins on which the wheels pivot are not worn.

2—Screeching of the brakes can be prevented by putting a few drops of oil on the brake drums. Be careful not to apply too much.

3—This is unobtainable.

4—Yes, because there are four strokes to every explosion in a four-cycle motor and two strokes every revolution.

Gasoline Consumption Is High

Editor THE AUTOMOBILE:—I have an E. M. F. 30 horsepower, 1910 five-passenger car and it has been making about 18 miles per gallon of gasoline. This year it is not making over 8 miles. I have had the cylinders cleaned, new spark plugs put in magneto and carbureter examined. The car runs and does about as well as ever, until after climbing hills or after the engine gets heated. It will begin to miss until after speed gets up to 10 or 12 miles per hour, then it will

run all right. After the engine becomes heated the spark lever works very bad.

Parkersburg, W. Va. A. B. PRESTON.

—We do not believe that the magneto is at fault or that the stiffness of the spark lever is causing the trouble. A method for limbering up the movement of the spark lever was given in the Rostrum for July 30, page 231.

Since your car only misses at speeds below 12 miles per hour and then only when warmed up, it seems likely that the heat causes a slight leakage, either by warping a valve or by expanding a valve stem. Test the compression when the motor is warm and if any cylinder is weak see whether it is not due to lack of clearance between valves and push rods or to a warped valve. These defects would cause enough leakage to make the motor misfire when the throttle is nearly closed but yet not enough to make it miss at wider throttle openings.

Faulty carburetion may also be the cause of the misfiring. Reduce the richness of the mixture when running slowly and see if this makes any difference. It is possible that the reduction in charge weight caused by the heating of the air is sufficient to decrease the ratio of air to gasoline enough to prevent combustion, although when the motor is cold enough air is taken in so that the motor will run all right.

Another possibility is that there is a leak in the intake manifold due to it warping out of shape when heated. Tighten up the bolts holding the manifold and if necessary put in new gaskets.

See that the brakes are not dragging and that the spark advance has not slipped so that you are running with it retarded.

Motor Gets Too Much Oil

Editor THE AUTOMOBILE:—I have an E. M. F. 30, 1910 car. This car, as you know, has an oil reservoir with a gauge. I have been bothered with the engine getting too much oil. I can fill the reservoir full of oil and it will remain in the gauge and tank all right, but as soon as I screw the nut on the oil tank it will go to the crankcase giving the engine too much oil and causing it to smoke.

I have looked everywhere and can find no place where the oil gets air and the oil pump does not leak as long as the nut is left off of the oil tank. If you can give me any advice as to how to remedy the trouble I will be greatly obliged.

Shannon City, Ia. W. A. HOFMANN.

—The oiling system, Fig. 3, on this car is so simple that there are very few places that it can cause trouble. It consists merely of a reservoir, integral with the crankcase, which has two oil pipes running to the front and rear compartments of the crankcase. A constant level is maintained in the crankcase automatically. When the level drops below the holes air makes its way up into the reservoir and allows oil to flow down until the level is brought up to normal.

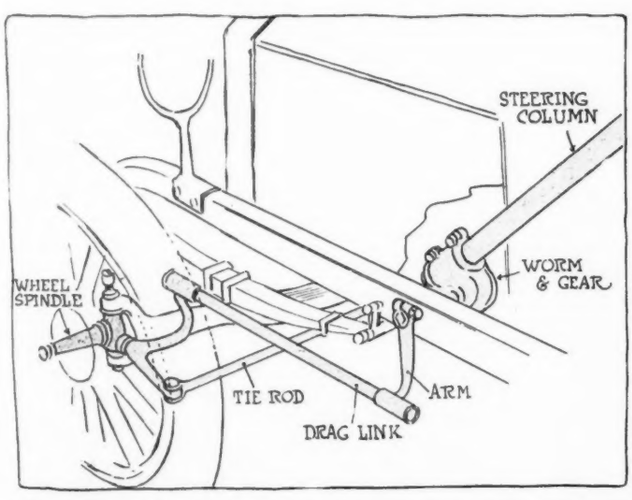


Fig. 2—Sketch of steering gear showing where wear may occur

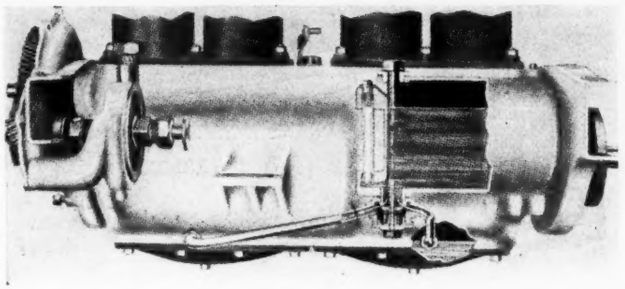


Fig. 3—Vacuum oiling system used on 1910 E. M. F.

An excess of oil can only occur when there is a leakage of air. The leakage may be caused by a worn rubber gasket on the filler cap, a cracked gauge glass or due to small holes in the casting. Inspection should reveal where this trouble is.

Excessive smoking, however, may be the result of using too light an oil, loose pistons or worn rings.

There is no pump in the system.

Marmon 48 Weighs 4880

Editor THE AUTOMOBILE:—What are the weights of the 1915 seven-passenger 48 Marmon with tanks empty and fully equipped?

2—What is the gearing of the Marmon on each of the speeds?

3—What system of lubrication does the new Locomobile use?

4—Which makes the best and most powerful six-cylinder motor, a 4.5 by 5.5 inches or 4.125 by 6 inches?

5—What is the piston displacement of an engine and how may it be found?

Beaver Falls, Pa. A SUBSCRIBER.

—1—The weight of the Marmon six 48 is 4,880.

2—The gearbox reductions on the Marmon are: Third—direct; second, 1.63 to 1; first, 3.36 to 1, and reverse, 4.33 to 1. There are four standard rear axle reductions, 3 1-18 to 1; 3.50 to 1; 3.77 to 1, and 4.08 to 1. With the 3.50 reduction the overall ratio between the rotation of the motor and the rear wheels is: Third, 3.50 to 1; second, 5.7 to 1; first, 11.75 to 1; reverse, 15.15 to 1.

3—The Locomobile system is a combination splash and pressure feed, the lubricant being supplied under pressure to the main bearings and the pressure being sufficient to overcome the centrifugal force due to the rotation of the crankshaft. The rest of the motor is lubricated by the splash created by the dipping of the connecting-rods in the troughs. The oil is supplied to the main bearings through a pipe running the length of the motor, a branch outlet going to each bearing, of which there are seven. Oil to the troughs is furnished by another pipe that squirts oil out of individual openings opposite each trough.

4—The 4.5 by 5.5-inch motor will develop more power providing that the design of the two is identical and that the maximum speed of both motors is the same. This is obvious because the 4.5 by 5.5-inch motor has a displacement of 349.9 cubic inches, while the 4.125 by 6-inch motor has a displacement of only 320.7 cubic inches.

5—The piston displacement means the actual volume of air in cubic inches that each piston displaces when moving the full length of the stroke multiplied by the number of

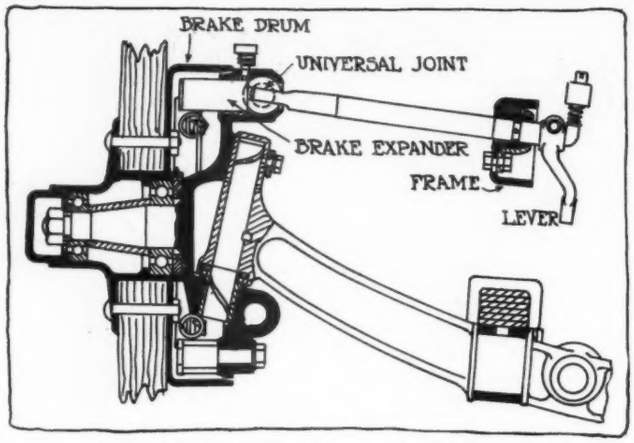


Fig. 4—Argyll front wheel brake construction

cylinders. It is calculated by multiplying the bore by itself, multiplying the result by the stroke and the number of cylinders and then by the constant .7854.

Expressed as a formula, this becomes,

Piston displacement = Bore^2 × Stroke × No. of cyls. × .7854.

The Construction of Front Wheel Brakes

Editor THE AUTOMOBILE:—Please explain by aid of a diagram the construction of the front wheel brake; and if it is possible to install them on a model 19 Buick.

Cincinnati, Ohio. A SUBSCRIBER.

—The construction of front wheel brakes is the same as that of any other brakes except that some special means must be employed for attaching the brake rods so that the wheels may be turned without affecting the brakes.

A typical brake is the Argyll, Fig. 4, in which expanding shoes are used. The movement of the wheel in steering is taken account of by fitting a combination slip and universal joint to the brake rod at the point where it enters the brake drum. The brake rod is also supported in the frame of the car by means of a ball joint so that the flexibility of this member is complete.

It is not advisable to fit front wheel brakes to your car although it is possible to do so. The objections are two in number, the first being the cost, and the second, the fact that the axles and springs are not designed to take this added strain.

Front wheel brakes are less liable to make the car skid when suddenly applied, and when used simultaneously with a rear set, the car can be stopped in about half the time.

Storage Battery Gives Trouble

Editor THE AUTOMOBILE:—1—Could one use 18-candlepower lamps throughout the Chalmers motor and the lights draw from all nine cells? Would not this eliminate this battery trouble that is now present? I have a Chalmers car and about every 3 weeks I have to take the battery to a garage to have it discharged and recharged.

2—What is the weight of the 1913 Pierce-Arrow 38?

3—I have been told that an automobile should have 1 horsepower to every 80 pounds of weight. Is this correct? If not give some formulæ.

4—How many miles per gallon should a 2-38 Packard touring car make in country driving? We only get 7 miles per gallon.

5—Were the electric starters tried out before 1910 and discovered that it required too much power from the motor?

Sudbury, Vt. G. E. S.

—1—You should have your battery and lighting system examined by a competent man as it should not give this trouble if it is in proper condition.

2—4,280 pounds.

3—The proportion of weight to horsepower is a matter of individual taste and also depends upon conditions under which the car is built, however, 80 pounds per horsepower should be satisfactory. If an extremely good hill-climber or a speed car is wanted this ratio might be reduced. On the other hand, the ratio might be exceeded if fuel economy alone were considered.

4—This car should make 13 miles to the gallon according to tests that were conducted by the A. C. A., on Long Island last winter. In these tests the car averaged 13.1 miles per gallon when running at an average speed of 20.8 miles per hour. At a speed of 40.6 miles the mileage dropped to 11. This was with all lamps lighted.

Assuming that you are getting full measure, your car is not as economical as it should be. Readjust the carbureter and see if it does not improve the economy. Drive with the spark as far advanced at all times as is possible without causing the motor to knock. See that the compression is good and that power is not being used by excessive friction at any point.

5—Electric starters were not used to any extent until 1911. They were not tested at some previous time and found that too much power was required as you suggest. At that time the problem was to make a reliable starter and it is doubtful if the question of economy was every raised.

How To Adjust High-Speed Clutch

Editor THE AUTOMOBILE:—1—On a model 40 Overland car, please describe the method of clutch adjustment. The high-speed clutch on this car will drop out occasionally. How can this trouble be overcome?

2—What is the bore and stroke of the engine?

3—The intake manifold on this car is quite long. If the manifold were cut off say 3 or 4 inches this would shorten the gas travel and perhaps avoid manifold condensation. What is your opinion of this proposition?

Haskell, N. J. C. H. BENTON.

—1—The slipping out of the high-speed clutch is probably due to wear in the clutch mechanism or the rod is out of adjustment. If the former is true then the play should be removed, while if the latter is the case the rod should be made the correct length.

2—The bore and stroke are 4 1-4 and 4 1-2 inches, respectively.

3—This would not be advisable for the reason that the difference in the level between the fuel in the tank and the float chamber would be considerably reduced, so much so that the gasoline would not flow on steep hills.

If you are troubled with condensation and are sure that the cause is not poor carbureter adjustment, bad ignition or lack of compression or some other cause, you had better fit a hot-air connection to the carbureter.

List of A. C. Rectifier Makers

Editor THE AUTOMOBILE:—My car carries a 40-ampere-hour storage battery. Will you please tell me through your Rostrum the best kind of apparatus to use in charging it. I have alternating current but no direct current. The A. C. voltage is 110.

Please advise me through the magazine as to the apparatus, its cost, connections, and where I can obtain it.

Steelton, Pa. JOHN B. DOWNS.

—Below is a list of concerns, taken from the Automobile Trade Directory, that make alternating current rectifiers suitable for charging storage batteries. The simpler of these systems can be attached indirectly to any lamp circuit by screwing in a plug. The prices of these devices vary from about $30 up.

American Battery Co., 1132-34 Fulton street, Chicago, Ill.

J. F. Ashbrook, 2639 Emmet street, Chicago, Ill.
Thomas A. Edison, 114 Lakeside avenue, Orange, N. J.
Efficiency Sales Co., 42 Broadway, New York City.
Electric Economy Co., Hyde Park, Mass.
Electric Products Co., Cleveland, Ohio.
Electric Storage Battery & Mfg. Co., Cincinnati, Ohio.
General Electric Co., Schenectady, New York.
Thomas Hickley, Belmar, N. J.
Murphy Electricity Rectifier Co., 187 N. Water St., Rochester, N. Y.
Service Battery Co., 2325-27 Wabash avenue, Chicago, Ill.
Sirch Electrical & Testing Co., 126 West Third St., Los Angeles, Cal.
Standard Metal Mfg. Co., Newark, N. J.
Wagner Electric & Mfg. Co., 6400 Plymouth Ave., St. Louis, Mo.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Wilson Supply Co., 1191 Gladys Ave., Cleveland, Ohio.

Why Maxwell Gear Slips Out

Editor THE AUTOMOBILE:—How can I adjust the direct drive of a two-cylinder Maxwell model A. B.? Every time I put the lever on the direct it slips for about a block before it takes hold and drive the car. This transmission is a two-speed planetary.

Larchmont, N. Y. G. L.

—This trouble is probably due to lack of adjustment of the planetary bands. On the outside of the transmission case there are two adjusting screws, one for the low speed band and the other for the reverse. Tighten up on these screws and your trouble should disappear.

It is also possible that there is not enough oil, or it may be that the high speed disk is worn, in which case it must be replaced. Should the trouble be caused by a worn finger, however, it may be eliminated by adjusting it.

American Co. Entered One Race

Editor THE AUTOMOBILE:—1—Did the old American Motors Co. ever enter automobile races? If so, did they win or take prizes in any important races?

2—Could you show me a cross-sectional view of the starting motor and generator used in the Electro system.

3—How many American cars were manufactured when the American Motors Co. went out of business?

San Diego, Cal. MARK JUNGK.

—1—According to the A. A. A. the American Motors Co. entered its own racing car in only one big event and that was at Atlanta, Ga., May 5, 6 and 7, 1910. The reason for the firm not entering any more races after that was because of a protest that its car at that race was not a stock model.

At the Atlanta meet, the car distinguished itself by finishing first in the 50-mile free-for-all, with Herbert Lytle driving. The time was 40:20:02. It came second in the 10-mile free-for-all, its time being 7:43:46. In the 200-mile stock chassis, 451-600 cubic inches race, it came in second; time 3 hours and 5 minutes. The car had a 4-cylinder engine with a 5.75-inch bore and a 5.5-inch stroke, giving a total piston displacement of 571.3 cubic inches. The weight of the car was 2,880 pounds. The car made a mile in 43.19.

2—The Electro system, which is manufactured by the Electro Light & Starter Co., Indianapolis, Ind., is a single unit type in which the starting motor, lighting generator and ignition system are combined. A section through the machine is shown in Fig. 5. The breaker and distributer mechanism are located at the right. The instrument is driven through this end and the commutator is at the opposite end.

The Electro system is a slow speed design in which the armature is driven at crankshaft speed. When operating as a generator it gives maximum current at 350 revolutions per minute, insuring a maximum recharge of the storage battery at about 7 miles per hour.

The gear reduction is automatic and operates only when the engine is being started. It gives a ratio of 25 to 1 and since the instrument when operating as a motor develops 3.5 horsepower, it is capable of turning over any engine at 55 revolutions per minute.

The shock due to the back firing of the motor is taken care of by a friction clutch at A. This cone is fiber faced and the cone ring B has springs C adjusted so as to give the proper friction for turning over the gasoline motor. If the engine backfires, the cone slips and the armature immediately carries it over until the engine starts. This does not affect the timing of the ignition as the distributer is keyed to the driving cone. The advance and retard of spark is accomplished the same as in the ordinary magneto.

3—When the American Motors Co. went out of business there were 3,285 American cars in use, according to the receiver of the company.

Gear Ratios of Racers

Editor THE AUTOMOBILE:—1—What was the gear ratio of the Marmon, Maxwell, Peugeot, Dusenberg, and Delage that competed at Indianapolis, May 30, 1914?

2—What is the horsepower and how many cubic inches of piston displacement has the motor in the Woods Mobilette?

3—What company bought the assets of the U. S. Motors Company when it went into the hands of the receivers?

4—What make of motor does the Saxon car use; rear axle; who designed the car; is not the Ford company putting out this car?

Cooper, N. C. S. B. TEW.

—1—Marmon, 2.33 to 1; Maxwell, 2 to 1; Peugeot, 3 to 1; Duesenberg, 2 to 1; Delage, 3 to 1.

2—The Woods Mobilette is rated at 12 horsepower and has a piston displacement of 69 cubic inches.

3—The purchaser was the Maxwell Motor Co., with W. E. Flanders at its head.

4—A Continental motor is used, and the rear axle is made by the Detroit Metal Products Co. The car was designed by G. W. Dunham. The concern making this car is in no way connected with the Ford company.

No Data on Life of High-Speed Motor

Editor THE AUTOMOBILE:—Please give me all data possible in these columns or refer me to a paper discussing the life and efficiency of high-speed motors (2,500 revolutions per minute or over) compared with the average motor having a maximum speed of 1,700 revolutions per minute.

Elmhurst, L. I. GEORGE W. GAY.

—We know of no paper on this subject.

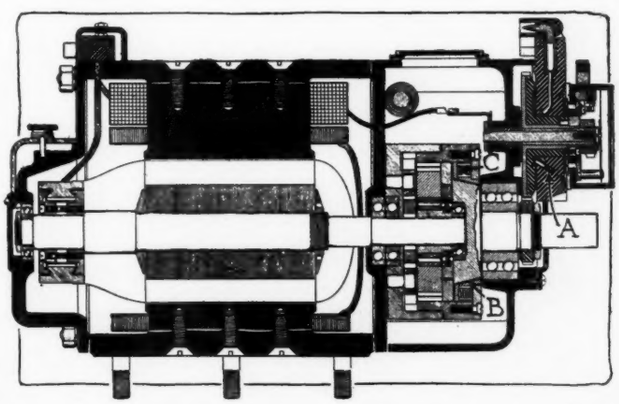


Fig. 5—Single unit electro system

The Engineering Digest

Two-Wheeled Schilowsky Automobile Balanced with a Gyroscope Weighing 750 Pounds

AN EXPERIMENT MAINLY OF SCIENTIFIC INTEREST

SINCE Brennan of England, Scherl of Germany and Schilowsky of Russia some years ago showed the wonders of monorail transportation, with gyroscopes to steady and balance the vehicles—the two former inventors using two gyroscopes spinning in opposite directions but Schilowsky only one—the question of the application of the gyroscopic principle to automobiles has aroused more or less interest, partly as a matter of scientific curiosity and partly with a view to the sport possibilities which seem to arise the moment a vehicle may be expected to turn corners at full speed without being upset. The theory of gyroscopes has in the meanwhile become better and more widely understood, though still remaining very difficult and obscure in some of its applications to practice, and it has been found necessary to move very slowly in attempting to make use of the principle for common carriers on wheels.

Very recently, however, Schilowsky has had built at the Wolseley Tool and Motor Car company's works a gyroscopically balanced automobile which runs on two wheels and has seats for six, and this car has been shown in operation in London, again bringing the subject to public attention.

The construction of this vehicle serves at least to show that, at the present stage, the mechanical complications and the increase in weight which the addition of a gyroscope equipment render necessary are very serious, apart from the encumbrance which the apparatus represents and the danger of unexpected effects which for some time yet must be associated with its use.

Worked by Heavy Pendulums

The precession or rocking of the gyroscope which tends to take place when it is forced out of its plane of action by movements of the vehicle, and which in turn can be utilized to right the vehicle, is controlled by means of two pendulums, one on each side of the vehicle. The pendulums weigh about 50 kilograms each and do not act on the gyroscope until they have swung to the limit of their lateral motion in the direction away from the vehicle. They are therefore independent of each other, and one of them obviates upsetting to one side and the other to the other side.

Figs. 1 and 2 show the mechanical arrangements of the vehicle in side view and plan, and Figs. 3 and 4 show side view and plan of the mechanical parts by which the gyroscope acts upon the vehicle frame. Fig. 5 shows the same in two transverse sections.

The Wolseley motor develops 25 horsepowers at 1,200 revolutions, and the power is transmitted through a four-speed gearbox to a drive shaft which is set off to one side because the rear wheel is occupying the middle plane. The offset is accomplished by a silent chain from the gearbox. The shaft drives a worm gear on the wheel axle between the wheel and one of the springs. The gears give vehicle speeds of 14, 27, 40 and 55 kilometers per hour.

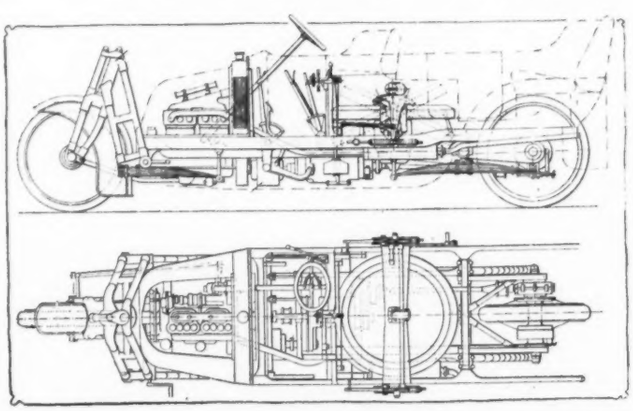
The gyroscope A is actuated electrically and comprises a forged steel disk slightly more than 1 meter in diameter and provided with a rim which weighs 254 kilograms and turns in a horizontal plane at speeds from 1,200 to 1,550 revolutions per minute. The electric motor B is secured to the frame F which carries the vertical axle C of the gyroscope, the armature being keyed directly to the latter. The axle C is guided in the interior of frame F by three roller bearings while heavy ball bearings support the weight of the gyroscope. All the bearings are lubricated from a special oil-circulating system for the gyroscope and its motor. The frame F is a stout casting and is mounted by means of the two stub shafts G in roller bearings secured to the main frame reaches of the vehicle.

The electrical energy used in motor B is furnished by a generator shown in Figs. 1 and 2, which is controlled by means of a coupling-sleeve and a chain taking their movement from the primary gearshaft. The normal speed of this generator is 2,000 revolutions per minute, but it can function at 3,500 revolutions for 15 minutes without heating unduly. If the generator exceeds 3,000 revolutions the gyroscope reaches its maximum speed of 1,550 revolutions and a commutator automatically cuts down the output of the generator so as to prevent further acceleration.

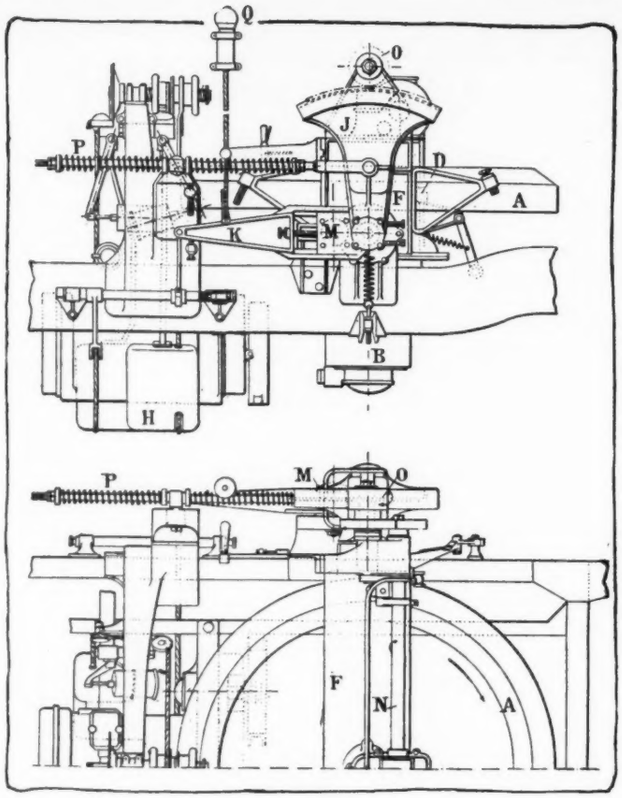
Reducing-Gears Force the Precession

Each of the two pendulums H is connected by a cable and various levers to an arm K at the opposite side of the vehicle, which arm is arranged to be lowered when the corresponding pendulum swings away from the vehicle. It is connected at a right angle with sector J the periphery of which, L, is toothed. At any given position of the shaft M of the arm K every oscillation outwardly of the corresponding pendulum raises the toothed sector J a certain amount.

To co-act with these elements, the movable frame F which supports the gyroscope carries in its upper portion a transverse shaft N to which is transmitted, through a worm, the movement of the shaft C of the gyroscope with a speed reduction of 66 to 1. It may be noted incidentally that shaft N rings a bell at every turn, and this in connection with a simple clockwork indicates at any moment the speed of the gyroscope. Shaft N actuates by suitable gears two spurwheels O which are located at the two sides of the vehicle and turn in opposite directions. Each of these spurwheels can



Figs. 1 and 2—Side and plan views of Schilowsky car, showing general arrangements



Figs. 3 and 4—Side and plan views of gyroscope and mechanism for operating it by automatic action of pendulums

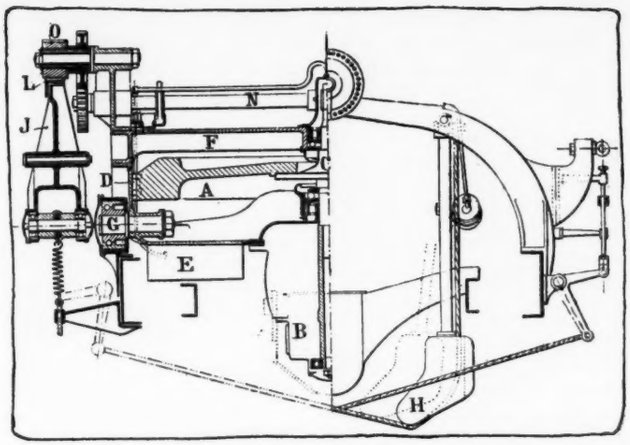


Fig. 5—Transverse sections in two planes through Figs. 3 or 4

mesh with the corresponding toothed sector L when the latter is raised through the action of the pendulum connected with it. It tends then to displace itself along the sector and exerts a pressure against the upper end of the shaft of the gyroscope, either forwardly or rearwardly—according to which of the two spurwheels is engaged—thereby throwing the precession movement in the direction adapted for re-establishing the equilibrium of the vehicle.

To prevent a violent effect from the sudden engagement of the toothed wheels with the sectors, the latter are braced in their vertical position by the spring struts P. The use of one instead of two gyroscopic disks renders necessary certain precautions when the vehicle is to make a turn in the same direction as that of the rotation of the gyroscope. By means of one of the levers Q, which normally serve to release or immobilize the gyroscopic mechanism, a special pressure is in that case put on the arm K to increase the precession movement in the required direction, the handle of Q being operated directly by the driver.

Takes 10 Minutes to Start

Two safety sprags are let down automatically, to give stable support for the vehicle, if for any reason the speed of the gyroscope becomes too small and allows the oscillating frame of the gyroscope to tip too far forward or backward. These sprags are provided with little rubber wheels and admit of maneuvering with the vehicle when the gyroscope is not running, as in the garage, for example.

For starting, certain precautions must be observed. The vehicle motor is started by hand at a speed of about 500 revolutions per minute which produces a current of 90 volts in the generator. The electric motor is thereafter set going gradually by means of a lever on the dashboard. The acceleration of the gyroscope absorbs 5 horsepowers. After about 5 minutes the velocity of the gyroscope reaches 1,000 revolutions which makes the automatic balancing of the vehicle possible. In order to find at the beginning the properly balanced position of the vehicle, it is first placed in a position departing about 5 degrees from the vertical and then the two control levers Q are released, thereby releasing also the arms K, so that the gyroscope can begin to act. The toothed sectors J are now alternately engaged with the corresponding toothed wheels under the influence of the pendulums which control them, and the gyroscope thus gradually brings the vehicle into the position which represents unstable equilibrium.

When the gyroscope has attained its maximum speed of 1,550 revolutions, the gasoline motor can be throttled down to still-running, as only from 1 to 1.3 horsepower is then required for maintaining the speed of the apparatus. If the power is cut off completely, the gyroscope will continue to run for 10 to 15 minutes before dropping to the minimum speed at which it ceases to be effective for the balancing of the vehicle.—From *Le Génie Civil*, July 4.

Experienced Driver Formulates a Wish for Improved Motor Control

MR. LEPEUX has driven cars for a number of years and owns one which easily runs at a rate of 80 kilometers per hour, but he considers that the greatest comfort is obtained by keeping up an almost uniform speed of about 50 kilometers per hour, on hills as well as on the level, whenever prudence does not command a slower gait. He has equipped his car with a speed indicator to enable him to know how fast he travels and aims to keep the hand steadily at the figure 50. But at this point he experiences a difficulty. His car needs very little gas to go at 50 kilometers and it is a rather delicate foot action with the accelerator pedal which is required to keep the speed from varying considerably on both sides of the desired mean. A moment of inattention or a light road shock throws the indicator hand to either side. In other words, he has to keep his foot half in the air, in a position which becomes very fatiguing on a long tour. He desires a remedy for this condition.

There is however, the gas lever which does the same as the accelerator, it is objected. Why not use it? Yes, but this lever cannot be operated rapidly. It consists of a screw which must be given several turns to effect the total acceleration that may be wanted. And then, even if the gas lever were handy to use, it would not solve the problem, for the following reasons:

At the start, when the motor is cold, the gas lever is placed at an adjustment which is the best for starting and which the driver soon knows by heart. When the motor has become hot, the driver adjusts the gas lever to the position for still running, so that the motor will not stop when there is

occasion for unclutching. This is common and well-known driving practice, mentioned only to make the rest clear.

Now on the road. To drive with the accelerator is fatiguing, as said, and gives an irregular gait. One can then try to drive with the gas lever. To this end, the gas is opened till the indicator shows the desired speed of 50 kilometers per hour on a nice level road. There is a hill ahead, say. A push of the accelerator, and we climb the hill without touching the gas lever, since the latter limits only the backward but not the forward stroke of the accelerator pedal. For the same reason, when the hill is passed, it suffices to release the pedal to make the vehicle resume its normal gait automatically. So far, all would thus be perfect—but: After the level road there follows a descent or a village or an unexpected obstacle demanding immediate checking of the car. Unclutching and braking are instinctive, but with these actions there comes the furious speeding-up of the motor; for the gas lever prevents the accelerator from closing. No less instinctively than before we rapidly push the gas lever back, but in doing so in a hurry we are almost sure to push it beyond the adjustment for still-running, and then the motor stops. Even if it does not stop it is necessary to find again the adjustment corresponding to our desired mean speed of 50 kilometers per hour. And this every time we unclutch!

If others have had the same experience, the modern car would seem to stand in need of a little improvement with regard to its motor control, Mr. Lepeux suggests.

To be sure, automatic governors have been used which never allowed the motor to run wild, but builders will probably not easily conclude to re-adopt this feature despite its advantages. The little problem which seems to present itself may therefore be formulated in the following combination of requirements:

(1) The accelerator should function in the ordinary manner.

(2) The gas lever should limit the backstroke of the accelerator pedal.

(3) When the clutch is withdrawn, the motor should come to its still-running adjustment without need of touching the gas lever. (For greater convenience this adjustment might be secured by a permanent regulation of the carbureter, independently of the gas lever.)

Is it impossible, asks Mr. Lepeux, to contrive this kind of control which would secure for all cars most of the advantages that an automatic governor offers. Such an improvement would not involve great expense. It might consist in applying, concurrently with the accelerator, a retarder device actuated by the brake pedal on the first one-third of its stroke, as has been done on certain vehicles. The control maneuver would then be very simple, as it would be sufficient at every unclutching to push the brake pedal also, to bring the motor to still-running.—From *Omnia*, July 15.

International Trade in Automobiles 123 Million Dollars

OBTAINING his figures from the customs statistics for 1913 in the different countries, a French actuarian, Max Dutray, has compiled the table appended herewith which shows the value of the automobiles sold by one country to another. The figures are of course much smaller than they would be if the sales of each country in its home market were included, still it is noticeable—when a comparison is made with other statistics giving the registration of cars in use and the increase from year to year—that of all the manufacturing countries the United States is probably the only one where the exports do not exceed the home sales. In England the sales to the British public are much larger than the exports only if the very large importations are included, while the importations in the United States have now dwindled to an insignificant figure.

In many instances the customs statistics are incomplete or misleading, as exports are not always listed with reference to the country of ultimate destination, the purchase being credited to the country where trans-shipment takes place. The compiler has corrected this error where it could be traced, as where Belgium was credited with most of the South American purchases from France, because these were shipped from Antwerp, but in many more cases it has not been possible to make this correction. This and other errors find their expression in the large purchases—amounting to 40 per cent. of the total sales—which are found under the heading "Diverse." From intrinsic evidence it is plain that "Diverse" includes many or all of the countries listed as purchasers besides many which are not listed. Assuming that the total of 50 million dollars worth of purchases is evenly divided between listed and unlisted countries, a 20 per cent. factor of inaccuracy in the purchase figures for the different countries listed should therefore be allowed, while the lack of

(*Continued on page* 267)

THE INTERNATIONAL AUTOMOBILE TRADE FOR 1913

BUYING COUNTRIES	SELLING COUNTRIES							Total Purchases
	Germany	England	Belgium	France	United States	Italy	Diverse	
Germany	.....	$383,408	$778,224	$1,465,184	$1,547,768	$126,480	$439,704	$4,740,768
England	$1,668,048	.....	761,395	10,355,340	3,566,600	1,670,142	302,877	18,324,402
Austria-Hungary	2,374,104	.....	.....	244,080	.....	204,019	.....	2,822,203
Algeria	.....	.....	.....	4,562,880	.....	.....	.....	4,562,880
Belgium	156,442	92,062	.....	269,163	.....	.....	93,020	610,687
Brazil	1,317,872	.....	258,662	1,740,660	.....	421,949	.....	3,739,143
Canada	.....	.....	.....	.....	8,177,256	.....	.....	8,177,256
Chile	248,496	.....	.....	.....	.....	.....	.....	248,496
Denmark	1,076,568	.....	.....	.....	.....	.....	.....	1,076,568
Spain	467,728	.....	85,892	1,364,700	.....	.....	.....	1,918,320
United States	214,701	161,667	.....	467,167	.....	153,039	158,299	1,154,873
France	547,440	1,267,080	123,916	.....	1,136,700	335,700	569,144	3,979,980
Japan	80,848	.....	.....	.....	.....	.....	.....	80,848
Italy	694,705	65,116	.....	880,744	388,595	.....	516,064	2,545,224
Mexico	.....	.....	.....	.....	408,148	.....	.....	408,148
Russia	5,740,456	.....	.....	1,309,680	.....	.....	.....	7,050,136
Argentine Republic	1,851,320	.....	787,940	3,444,180	.....	874,037	.....	6,957,477
Switzerland	506,168	.....	.....	954,300	.....	185,385	.....	1,645,853
Turkey	.....	.....	.....	192,960	.....	.....	.....	192,960
Uruguay	263,376	.....	.....	.....	.....	.....	.....	263,376
Sundry Amer. States	.....	.....	.....	.....	3,008,005	.....	.....	3,008,005
Diverse	6,883,936	12,483,685	1,054,640	18,234,721	8,796,380	2,393,502	.....	49,846,864
Total sales	$24,092,208	$14,453,018	$3,850,669	$45,485,759	$27,029,452	$6,364,253	$2,079,108	$123,354,467

Exhaust Jacket on New Kerosene Carbureter

Float Chamber and Venturi Tube Surrounded by Exhaust Heat—No Spring Controlled Valves

IN the kerosene carbureter announced by the Senrab Carbureter Co., Sea Cliff, L. I., the vaporization of the fuel is aided by passing part of the exhaust gas into a jacket completely surrounding the float chamber and venturi tube. This heat acts on the thin film of fuel between the wall of the float chamber and the float so that the fuel is adequately heated.

Suitable means for starting with gasoline are provided for by a connection to the side of the carbureter body. Only a few seconds' running on gasoline will be required and the engine can then be allowed to run continuously on kerosene.

An ingenious method has been devised for regulation of the fuel and air supplies, whereby the proportionate quantities of fuel, as well as the main and auxiliary air supplies, may be furnished in proper quantities to suit varying cylinder requirements. In other words, the Senrab carbureter is so arranged that the adjustment of a single moving part effects in proper ratio the fuel supply, the main air supply, and the auxiliary air supply; and under different degrees of running the user can depend upon the admission into the cylinder of a correctly proportioned mixture of fuel and air without the necessity of separately adjusting the several supplies.

Venturi Increases Velocity

The Senrab has taken advantage of the known characteristics of the venturi tube as a passage for the main air supply, because of the increased velocity through a passage having a constricted throat, and because the tube lends itself to the convenient regulation of air by means of a central moving member C, having an annular shoulder directed towards the constricted portion of the tube. This moving member is placed in axial relation to the venturi and carries a tubular fuel supply with radial orifices slightly above the annular shoulder, through which the heated fuel is allowed to pass under the control of a long taper needle and mix with a proportionate amount of air passing through the venturi at high velocity.

In order to provide for atmospheric conditions, the auxiliary valve may be adjusted by revolving the center stem. The needle may also be independently adjusted for varying qualities of fuel.

A method has been provided for control by a lever on top of the carbureter. This lever may be set on the right or left side, or turned in an upward or downward position as desired.

Adjustment Is Simple

The adjustment of the carbureter is simple and permanent. To decrease the quantity of fuel the needle valve A is screwed down after releasing its locknut, while to increase the volume of mixture the collar B is placed higher on its stem. The adjustment of the auxiliary valve is accomplished by revolving the stem after loosening the set screw holding it. After these initial adjustments have been made it is claimed that the carbureter will deliver a proper mixture at all speeds and loads. The throttling function changes the capacity of the carbureter and the mixture does not change owing to the various demands on the motor, it is stated.

If when making these adjustments it is found that the carbureter precipitates moisture on the screen E, it indicates that the velocity is not sufficient for proper vaporization and the stem D should be lowered until the exhaust shows good combustion.

The intake F is for gasoline which is used in starting. After running a few seconds on gasoline sufficient heat is generated in the float-chamber jacket to allow engine to run on kerosene. The kerosene connection is at G, and a portion of the exhaust is by-passed into the inlet H and discharged at J.

On carbureters above the 1-inch size a sight glass is provided at K for inspecting the fuel level. If the fuel is flowing properly the level will be little above the center of the glass.

The prices vary from $15 for the 3-4-inch model to $36 for the 2 1-2-inch.

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International Trade in Automobiles

(*Continued from page* 266)

specifications under "Diverse" may also conceal the omission of some important purchasing countries, such as Australia, British India, the Dutch Indies, South Africa and others.

The sales column naturally comes closer to the true figures, the "Diverse" heading in this case representing only 1.6 per cent. of the total sales.

With allowance for the inaccuracies, it is noticed that the principal purchasing countries, among those listed, rank as follows: England $18,000,000; Canada $8,000,000; Russia $7,000,000; Argentine Republic $7,000,000; Germany $4,600,000; Algeria $4,400,000; France $4,000,000; Brazil $3,600,000; Italy $2,400,000.—From *Omnia*, July 4.

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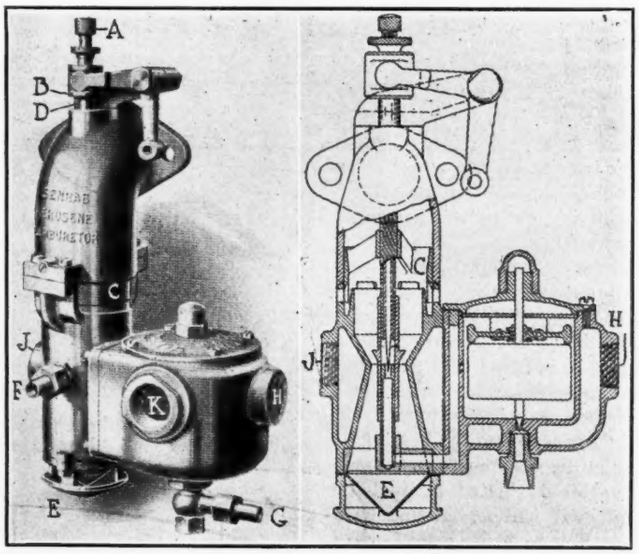
Tests for Cars with Two-Cycle Motors

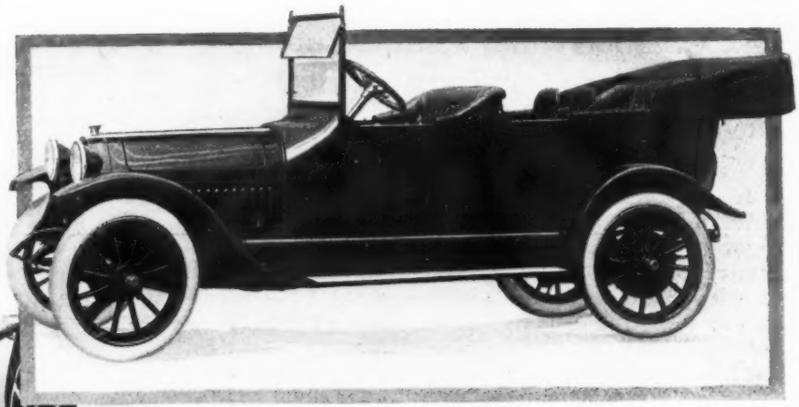
ACCORDING to *The Automobile Engineer* the Royal Automobile Club of Great Britain has issued preliminary regulations for contemplated open-competition tests of two-cycle motors fitted to cars. The tests will include a run of 1,000 miles on the road, with records taken at intervals of the temperature of the cooling-water; tests of car speed on the level without misfires of motor and with records of acceleration on top gear from minimum speed; hill-climbing tests; fuel and oil consumption tests and tests relating to the facility for starting the motor from cold with a given fuel. Noise and vibration will be considered in the awards.

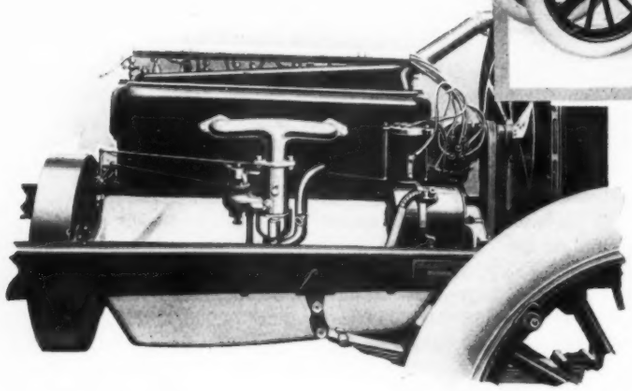


Senrab kerosene carbureter. Right—Elevation of carbureter. Left—Sectional view

15 Per Cent. More Power in Studebakers

Four Now Sells for $985 —Five Passenger Six, $1,385— Seven Passenger Six, $1,450



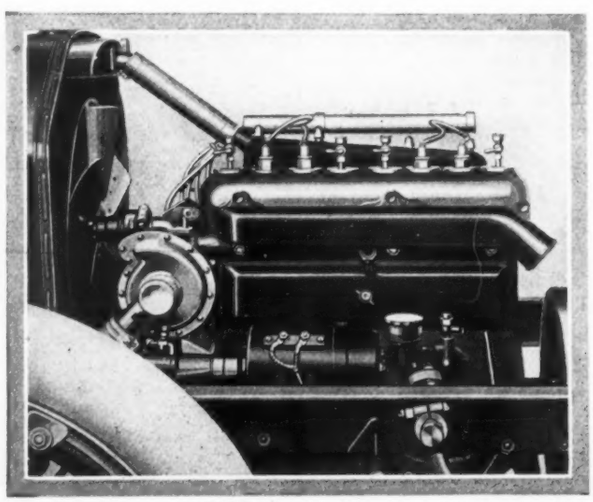


Above—Studebaker seven passenger six touring car for 1915 which with complete equipment sells for $1,450

Left—Intake side of six cylinder motor used in 1915 Studebaker showing Wagner starting motor and Remy distributor as well as Schebler hot jacketed carbureter

STUDEBAKER will continue for 1915 the two chassis, a four and a six, that made up the 1914 line. While the cars are the same as last year in all the elemental features of design, improvements have been made throughout the chassis, body and equipment with the result that the cars are lighter, stronger, roomier and more powerful, although selling for $65 less than last year in the case of the four and $190 less in the six. The price of the four is now $985 and for the six $1,385, with a five-passenger body, and $1,450 with a seven-passenger.

In the motors the maximum power has been increased 15 per cent., according to the Studebaker engineers, by reducing the weights of the reciprocating parts and altering the manifold design. Four ounces has been cut from the piston assembly by using lighter pistons with three rings. The valve sizes remain the same, but the valve ports have been made larger, thereby increasing the efficiency of the motor both as regards intake and exhaust. The splash scoop has been changed in shape and the splash troughs altered to give greater oil economy. While the model R Schebler carbureter is still used it is fitted this year with a waterjacket and also has a means for pre-heating the intake gases from the heat of the exhaust. In the four the carbureter is bolted against the integral cylinder casting without any exterior intake manifold.



Valve side of four cylinder Studebaker motor showing mounting of electric generator and water pump

The same clutch has been kept for the 1915 car, but the leverage on the operating members on the six has been changed to give an easier throw. The design of the rear axle has been altered and instead of the exterior flange connection with the wheel it now has a tapered-fitting connection with the driving flange and carries a hub cap.

Bodies 100 Pounds Lighter

The improvements in the body work and equipment are marked and through them 100 pounds has been cut from the weight of each model. In the body much of the woodwork has been replaced by pressed steel. This has resulted in a roomier design of much less weight. The top now used is a one-man design. The curtains can be put up from the inside of the car and clip to the windshield which is also a new design for 1915.

The instrument board is now a stamping and is so arranged that the instruments project through it but are not supported by it. It is possible by this construction to remove the instrument board and still leave all the instruments in place. The running-board pads have been made of corrugated rolled aluminum which extend the entire length of the running boards. Dome-shaped fenders and improved splash guards add to the appearance of the car.

The interior arrangements permit of more leg room in both the front compartment and the tonneau. There is more clearance between the steering wheel and the cushion, secured by decreasing the steering wheel rake slightly. There is also more clearance between the control levers and the seat. The starting switch for the Wagner system has been moved forward.

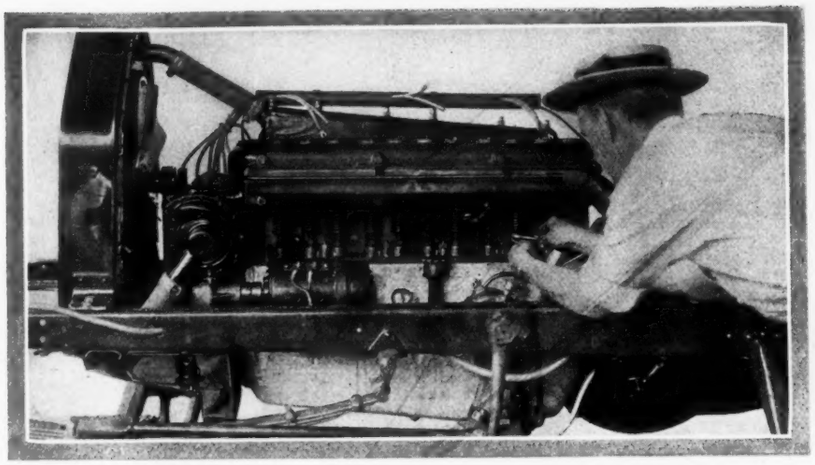
Features of Design Similar

In many details of design the six and four are exactly alike.

Both have their cylinders cast in block, both are L-heads and in bore and stroke, 3.5 by 5, are also similar. This method of duplication of design fits in with the Studebaker policy of standardization for quantity production which is carried throughout both chassis. The pistons, connecting-rods, wristpins and valve assembly are exactly the same in both cars.

The pistons carry but two compression rings this year, as against three in previous designs. An oil-wiper ring is carried at the bottom of the piston in addition. The rings this year are concentric and in manufacture are lapped in the cylinders. The wristpins have bronze bushings.

The 1 13-16-inch valves are carried on the left side of the motor and the adjusting nuts and exterior mechanism are covered by means of light dust-proof plates held in postion by thumb nuts.



Valve side of Studebaker six motor, showing accessibility of valve adjustment

The crankshaft of the four-cylinder motor is carried on three main bearings and that of the six on four. In both instances the front bearings are 1 5-8 inches in diameter and 2 15-16 inches in length, the center 1 11-16 by 2.5 and the rear 1 3-4 by 3 1-2. The bearings are babbitt lined, the babbitt being run in at the factory.

The motor lubrication system is accomplished by a combination force-feed and splash. The supply of oil passing to the motor is visible through a sight feed mounted on the dash. The oil supply is carried in the lower part of the crankcase and from this reservoir the oil is lifted to the sight feed by means of a steel plunger pump. The motor bearings and the cylinders are taken care of by the splash, while the timing gears and connecting-rod bearings are oiled by direct circulation. The splash scoops and troughs are new designs for 1915.

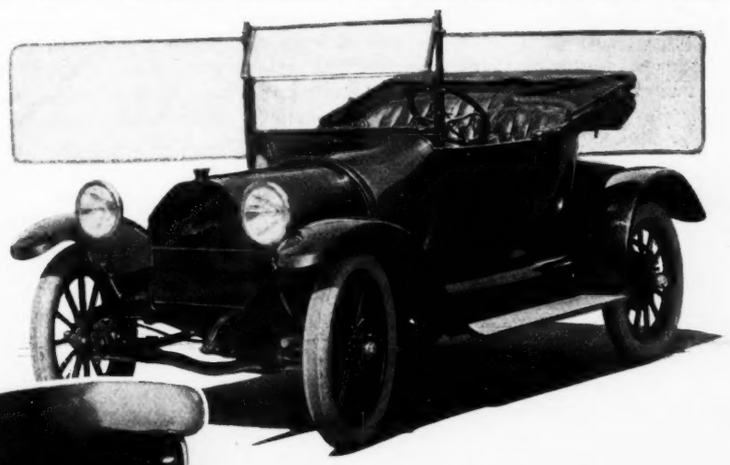
Cooling is accomplished in the six by means of a honeycomb radiator. In the four a vertical tube radiator with an auxiliary tank is used. Both cars use the centrifugal water pump. The cooling problem in the four has been greatly simplified by the use of a larger exhaust pipe than for 1914.

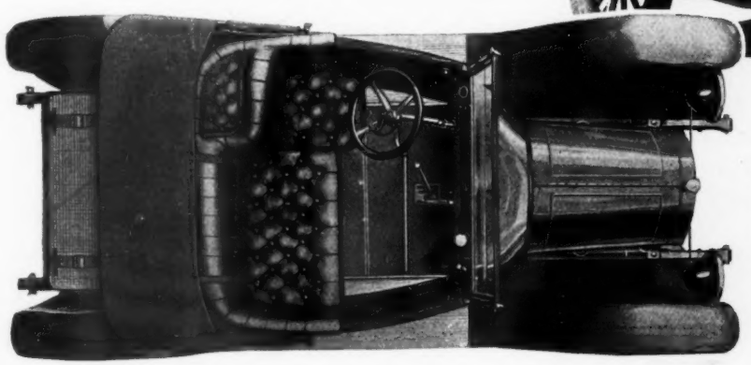
Practically no change has been made in the electrical equipment of the car for this year. Starting, lighting and ignition are still handled by the two-unit Wagner-Studebaker system. One step toward compactness, however, has been accomplished in the motor. This is fully an inch shorter in overall length now than it was in the 1914 line.

The two electrical units are the generator and the cranking motor. The electric motor for starting is connected to the engine crankshaft by means of a roller chain. By means of this chain and a pinion gear reduction the relation of the cranking motor speed to the crankshaft is 20 to 1. The gear reduction is 5 to 1 and the chain multiplies this by four. Owing to decreased internal friction of the motor and the lighter parts the speed of cranking the motor is higher this year than in the previous cars. The actual speed, of course, varies under different motor conditions, but the average amperage draw on starting is 100. The cranking motor is operated by a pedal on the toe board. Connection is broken between the engine and the starting motor as soon as the engine takes up its work by means of a roller clutch. The roller clutch is placed on the crankshaft and therefore when it is out of engagement the entire chain-drive mechanism is silenced as it comes to rest.

The generator which furnishes all the current for lighting and ignition is driven at the ratio of 1.5 crankshaft speed by means of a gear on the camshaft. The generator starts to charge the battery at a car speed of 10 miles per hour and reaches its maximum output at 20 miles per hour.

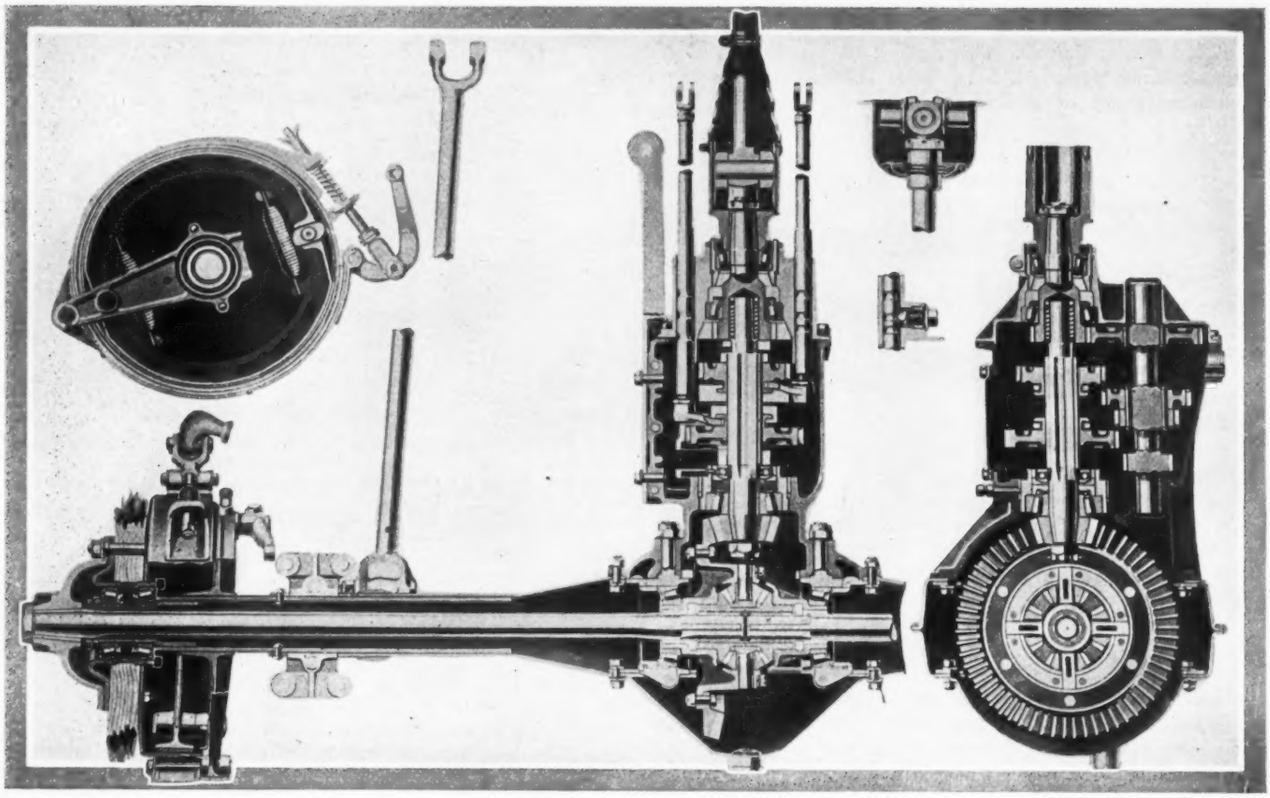
For ignition the current is taken from the storage battery and, after passing through an induction coil, is led to the Remy distributer on the end of the transverse shaft at the front end of the motor. From this point the leads are taken





Above—Three-quarter of Studebaker four-cylinder, three-passenger roadster for 1915. Two of the passengers sit at the driver's right, the driver's seat being slightly in advance of the seat for the other two. Note the broad doors and ample storage space in the rear

Left—Plan view of three-passenger, four-cylinder roadster, showing the seating arrangement with the compartment in the back of the driver's seat which is slightly in advance of the seat for the other two persons



Cross section through the Studebaker rear axle, together with a side view through the gearbox and through the differential. At upper left is interior of brake drum

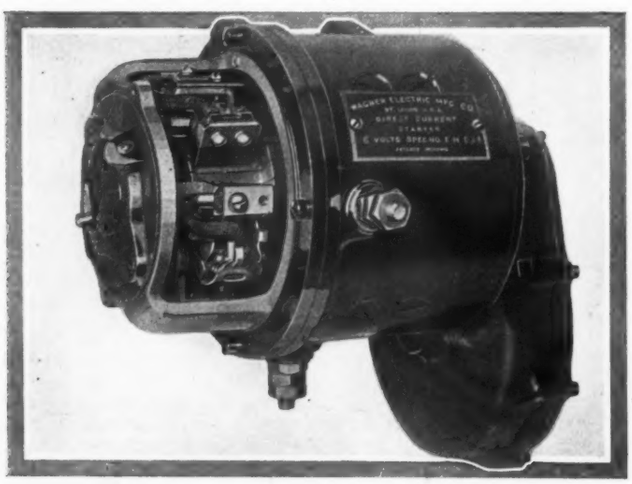
to the spark plugs. Dry cells are furnished for emergency use. The ignition switch is at the driver's right.

Cams in Steering Mechanism

The control mechanism of the spark and throttle has been modified somewhat this year. In place of the ordinary bell crank levers at the ends of the control shafts which project through the bottom of the steering column there are cams which act as guides for L-shaped followers.

The carbureter is turned longitudinally this year instead of transversely, and the result is a neater and more accessible job.

The clutches used on the six and four are direct cones of pressed steel faced with leather, beneath which are placed flat engagement springs. A single clutch spring of heat-treated alloy steel is used. The clutch fork arm on the six is shorter this year than last, while the pedal arm remains the same length, thereby giving an increased leverage on the clutch.



Wagner direct current starter used on 1915 Studebaker

The gearboxes are another point of exact similarity between the two chassis. They are three-speed selective and are the same as have been used in Studebaker cars for three seasons.

The rear axles are floating designs and the same as for 1914 in every particular up to the construction at the wheels. Here the change mentioned has been made and the exterior of the wheels are ornamented by a hub cap. The most material result in the new construction is the elimination of grease leakage from the differential housing to the brakes through the axle tube. The brake diameter has been increased 3 inches and now both brakes are lined with asbestos fabric, whereas on the previous model one set was metal-to-metal.

The rear springs are a point of difference between the four and six. On the four, scroll elliptic springs underslung under the rear axle housing are used, while on the six a deep three-quarter elliptic design is employed.

The wheels on both cars are of second-growth hickory artillery design. On the four they are fitted with 33 by 4-inch tires, an oversize for the 32 by 3.5-inch size which was used in the previous model. On the six the 34 by 4-inch size are used. This gives both cars an ample tire size, as the four weighs 2,500 pounds and the six 3,000 fitted with the standard bodies.

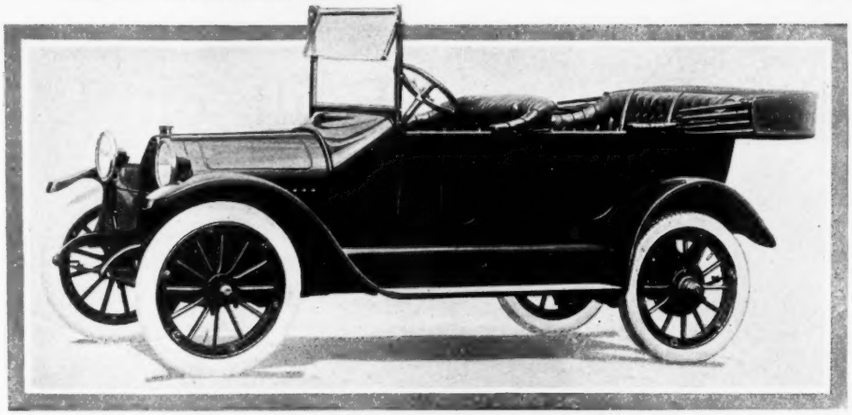
On the six there are two bodies fitted, a five and a seven-passenger touring design. On the four there is a five-passenger touring car and a three-passenger roadster. This gives a complete line of four bodies.

Everything is made as tight as possible. This year a strip of anti-squeak fabric is placed between the body and the frame for the sake of silence, and the windshield is lined

with rubber for waterproof qualities.

The fenders are crowned and, with the body, undergo twenty-four operations in the paintshop before finishing. The hood, fenders and running gear are black with a narrow white stripe, while the bodies are a dark blue striped with white. The bright parts are heavily nickel-plated. The wheelbase of the four is 108 inches, and of the six 121 inches.

The equipment of the cars is complete. There are no dash lamps, but instead a series-multiple switch on the dash enables the driver to dim the headlights. On the dash there is the Stewart-Warner magnetic speedometer, gasoline filler cap for the under-cowl tank, Triumph gasoline gauge, sight feed, etc., while the additional equipment includes an electric horn under the hood, extra rim on rear tire irons and a full set of tools.



Four-cylinder five-passenger touring car selling for $985 completely equipped

Empire Continues One Chassis and Three Bodies—$50 Less

INCREASED production, continuation of the one chassis policy, $50 reduction in price and introduction of a new type in an electrically started and lighted streamline touring car, selling for less than $1,000, are features of the 1915 program of the Empire Automobile Co., Indianapolis, Ind. This gives the company a line of three cars, a roadster being carried with the two touring cars.

The new touring car at $975 has a streamline body and many points of Continental design as well as electric starting and lighting. Seats are set low, allowing seat backs of more than ordinary height. Upholstering throughout is Turkish type of selected leather. All door hinges are concealed, and with the body tapering back from cowl, gives a most pleasing flush side effect, completed by the limousine back. Roll crown fenders add to the general attractive appearance.

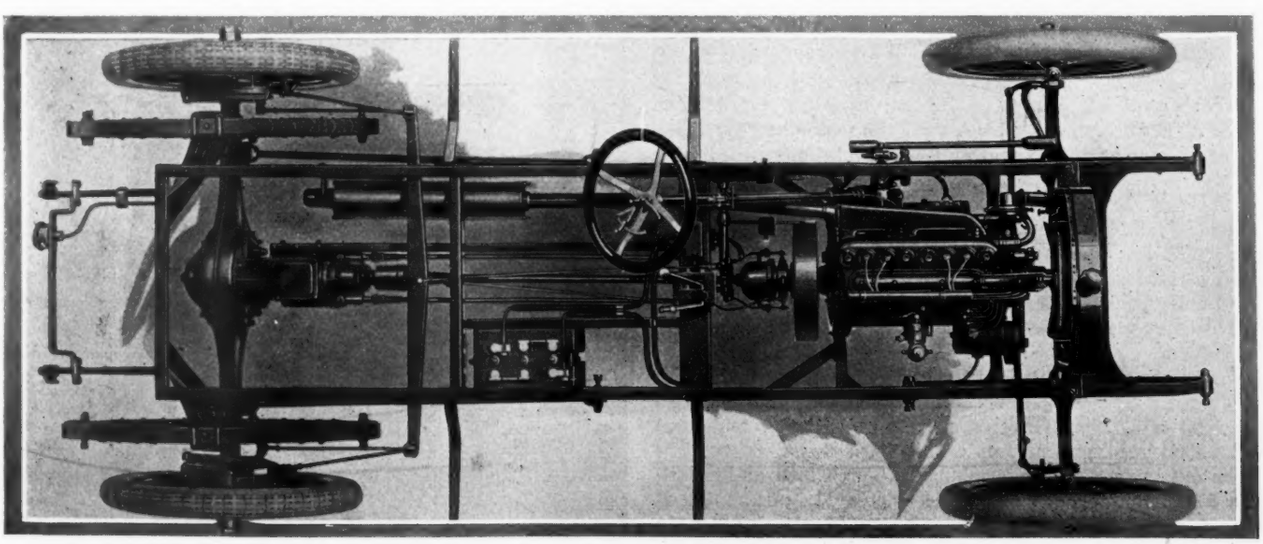
Starter button is of plunger type on dash, while all other instruments, such as speedometers, carbureter adjustment, dash light, ignition switch, battery indicator, light controls, etc., are assembled on an instrument board sheltered by the cowl. Remy one-unit electric system, with starting, generating and ignition of magneto type with spark advance, is fitted. Not only the car itself but also the entire electric equipment, including Willard oversize storage battery, is covered by a 1 year guarantee. Non-skid tires are furnished on rear.

The Empire Standard Model 31 non-electric car, with complete equipment, including mohair top, top boot, curtains, Stewart speedometer, Prest-O-Lite tank, oil side and tail lamps, quick detachable demountable rims, etc., lists at $850. This is in its fourth season, newly improved and refined in many points of detail. Thus, option of either electric or standard car is offered the purchaser. In addition to the touring models the line includes a roadster model furnished either with standard equipment at $875 or with electric starting and lighting at $975.

The chassis has been continued for four seasons without a change in any basic principle of construction. It has a unit power plant with a four-cylinder L-head motor of 3 3-4-inch bore and 4 1-2-inch stroke. Cooling is of the thermo-syphon system with fan, while the lubrication is constant level with force feed by motor pump and three sight feeds on the dash. The motor is fitted with Holley model H carbureter, with dash adjustment. The clutch is a disk type running in oil, while the transmission is selective sliding, with three speeds forward and reverse. Weston-Mott axles are used for both front and rear.

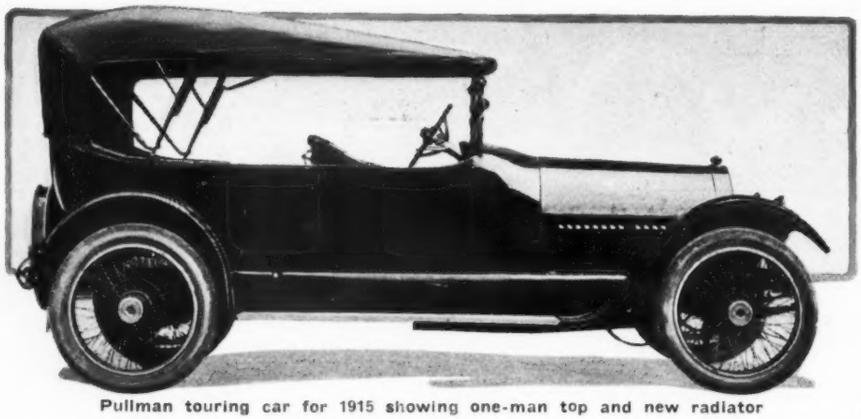
Warner steering gear with 17-inch wheel is also incorporated. Brakes are external contracting and internal expanding, operating on 12-inch drums on each rear wheel.

On these cars, the company will double production over the last season to meet the demands of its dealers.



Plan view of Studebaker four-cylinder chassis, showing mounting of storage battery at right of frame, rear axle gearbox and elliptic rear springs

1915 Pullman Built on Light Six Lines



Pullman touring car for 1915 showing one-man top and new radiator

Minor Refinements on Model 6-48— Wheelbase 134 Inches— Body More Roomy— Lighter and Larger Radiator

THE Pullman Motor Car Co., of York, Pa., will continue the model 6-48 in practically the same form as was introduced at the last New York Show. There have been some refinements, however, the wheelbase having been lengthened 4 inches, making it 134, and this of course has necessitated a larger body and a strengthening of the spring suspension although the car has been lightened throughout. The body has 2 more inches room in the driver's compartment and 6 inches in the tonneau. The seats have been widened and deepened, the rear doors brought back and a leatherette top is used in place of mohair. The dash is now covered with leather and a 12-volt electric system used for starting, lighting and gearshifting. A lighter radiator with larger cooling capacity. The price remains the same at $2,350.

Fitted with the Vulcan electric gearshift an additional charge of $150 is made.

The equipment includes a full set of tools, extra wire wheel, motor-driven tire pump, speedometer, and one-man top, held down at the front end by a special attachment on the windshield, thus eliminating straps.

This car is built generally along the light six lines which have come into vogue in the past year. It embodies advanced design straight through from the small six engine to the electric gearshift and streamline type of body.

The motor weighs 600 pounds, including the flywheel and regular equipment. It is of the L-head type and forms a unit power plant with inclosed valve mechanism and three-point suspension. The bore is 3.75 inches and the stroke is 5.25 inches, giving a horsepower rating of 34 according to the S. A. E. formula. On block tests the motor has developed 38 horsepower at approximately 1,500 revolutions per minute.

Cylinders Cast in Threes

The six-cylinders are cast in threes from close grained gray iron which has been aged after the rough boring process to eliminate casting distortions. The cylinder base flange is broad and forms the bases of the guides for the valve lifters. This construction allows for the cover plates which inclose the valves.

The valves are mounted on the right side of the motor and are operated by a single camshaft having the cams integral. The inlet and exhaust valves are interchangeable and have nickel steel heads mounted on carbon steel stems.

The oiling system is a combination force feed and splash with a constant level. The oil is circulated by pumping it through a gear pump with a gallon a minute capacity directly to the main bearings. The overflow from these bearings goes into the splash troughs and also into oil pockets which are designed to feed the lubricant to the timing gears and the silent chain which provides the generator drive.

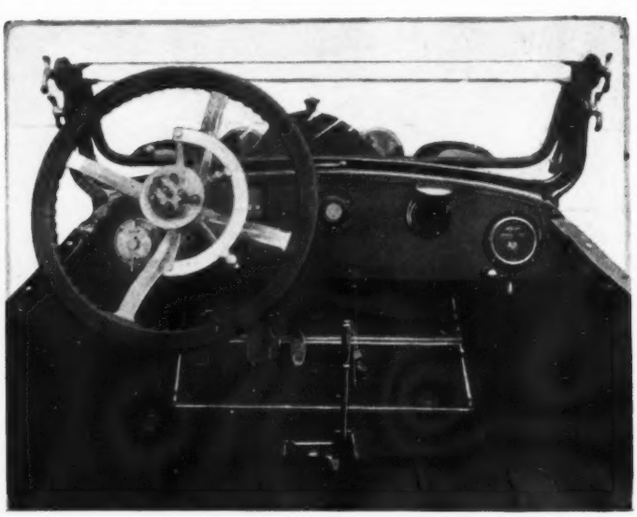
A multiple disk clutch is used on this car. It is composed of twenty-one disks alternate faces being covered with Raybestos. The tension is provided by two independent clutch springs. This clutch is housed directly with the flywheel and the housing is carried back to include the gearbox, thus providing the unit power plant.

The electrical equipment of the car divides itself into four separate and independent systems for lighting, starting, ignition and gearshifting.

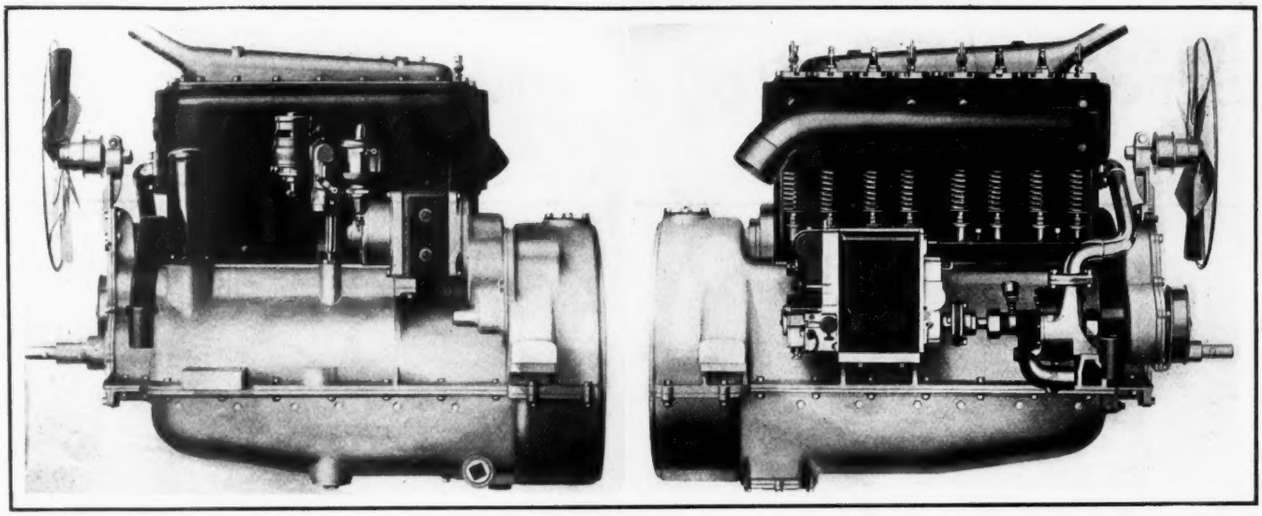
Lighting is taken care of by a Westinghouse six-volt generator connected with a storage battery. The headlights can be dimmed for city driving.

Gearshifting is accomplished by the Vulcan electric device which operates with current taken from the battery. The gearshifting is controlled by a series of buttons located on the end of the steering column which are so arranged that they do not turn with the wheel but are always in the same position.

The control features are all on the left side of the car and the emergency brake lever is mounted to the right of the driver's seat or in the center of the car. The dash equipment is carried on a cowl board and the gasoline tank of 20 gallons capacity is mounted in the cowl.



View of front seat in 1915 Pullman, showing leather-covered dash and Vulcan electric gearshift buttons on steering column



Intake side of new Kissel four motor. Note high mounting of carbureter

Valve side of motor, showing mounting of electrical system on pump shaft

Detachable Sedan Top New Kissel Feature

Four-Cylinder Touring Car Price Cut to $1,450—Sedan $350 Extra

THE new KisselKar 36 has a lower price than any previous model, and also introduces an innovation in the shape of a detachable sedan top for winter use. The price of the 36 with the touring body only, is $1,450, and the detachable top can be had for $350 additional.

To convert the touring car it is necessary to remove only the windshield, summer top and moulding, and then to screw a metal plate over the door latches. Removal of the detachable top reveals the two-door touring body with individual forward seats. The four-door body can be had for the same price as the two-door, and for $100 more, two disappearing seats and extra tires are included.

The motor is new. It is of an L-head block type cast in the Kissel foundries. Its bore is 4 1-4 inches and its stroke is 5 1-2. It has 2 3-16-inch valves with nickel steel heads. Both valves and lifters are completely housed. The aluminum crankcase is very rigidly constructed with parting line 2 inches below the large diameter crankshaft.

The oil basin, which is of aluminum alloy, has troughs into which connecting-rods dip, and these are filled by means of a positive gear pump which furnishes a uniform stream of lubricating fluid. The oil is drained back into the reservoir in the lower part of the oil basin, through a fine screen before entering the pump for re-distribution.

Carbureter Mounted Directly on Cylinders

Three helical timing gears are used to drive the camshaft, circulating pump and the magneto. The camshaft is of special alloy steel and supported on large white brass bearings. A 16-inch safety blade fan that can under no circumstances cut the radiator is used. The Mercedes honeycomb type of radiator is used. A Stromberg carbureter is used. This is connected directly to the cylinders, doing away with intake pipes.

The power plant is a unit with four speeds, three forward and one reverse. The large leather-faced cone clutch is integral with transmission, and is accessible for adjustment by removing a manhole cover located amidships. Adjustable spring inserts are placed under the leather to insure a smooth and easy engagement. All gears and shafts are of nickel steel, heat-treated.

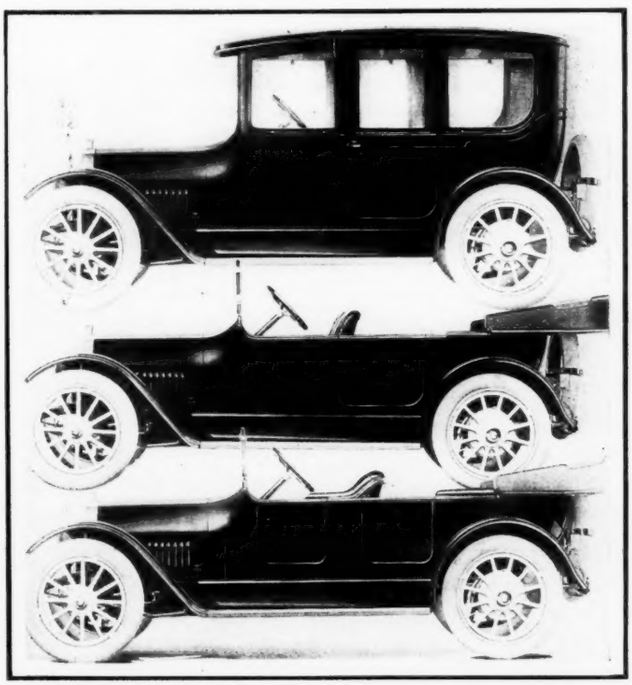
Starting, lighting and ignition are in two units, the Kissel starting system being retained. The Westinghouse system is used for ignition and lighting.

All electric wires on the 36-Four are centralized on a panel attached to the front of the dash. This feature permits the instant location of trouble, and in addition makes it possible to remove the body without cutting a wire.

The wheelbase is 121 inches and the tires are 34 by 4. The frame is of pressed steel with a tapering front to allow short turning. The control levers are at the driver's right in the center of the car. The driver's seat is on the left.

Differential is mounted on taper roller bearings, as are the front and rear wheels. F. & S. annular ball bearings are used in the transmission.

The Stewart vacuum gasoline system has been added to this car. The 18-gallon main tank is in the rear.



Top—Kissel four two-door touring car with detachable sedan top. Middle—Same car with ordinary top. Bottom—Four-door touring

Streamline Body on 1915 Saxons

Great Improvement In Construction—Better Material—Price Remains at $395

Left—Three-quarter front view of 1915 Saxon with top up and showing new streamline body. Right—Side view of new Saxon. Note running board and tank filler in cowl.

REPLETE with refinements in finish and mechanical construction, the new Saxon for 1915 continues to be sold at $395. This concern, which was organized last year under the name of the Saxon Motor Co., Detroit, Mich., by a number of men connected with the Chalmers Motor Co., has passed a successful year, showing clearly the field of the light car selling at less than $400.

In bringing the Saxon car up to date its external appearance has been altered to a large extent by the fitting of a larger body of streamline form, complete running boards and superior upholstery. In fact, throughout the car, better material will be found than in the previous model. There is now a three-hinged bonnet in place of the one-piece design, rendering it easier to open and making a more rigid job on account of the rod which fits across the top of the bonnet from the radiator to the cowl. The gasoline tank filler cap is now on the cowl, making it unnecessary to remove the bonnet to fill the tank. The starting handle is now polished steel, and the bonnet locks have concealed hinges. In outfitting the body a rubber floor mat is now supplied. The cushions are softer, the seat backs deeper and the springs in the cushions are a tied type, making for greater comfort.

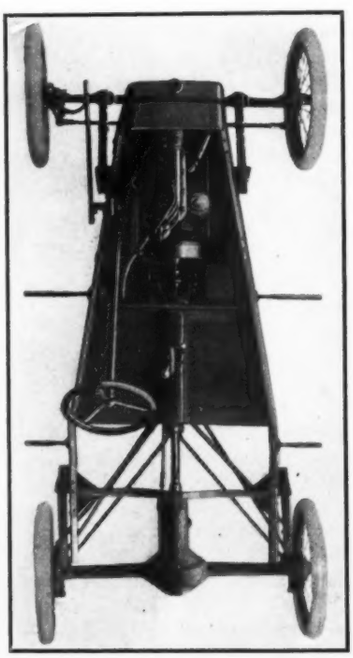
Throughout the entire body-work better finishing has been accomplished. The door locks have been improved and are now a fully concealed design. There is a trim strip on the top of the door and a strap on the right side which prevents it from striking the generator and scratching the door.

Headlights Now in Front

The enamel on the radiator is now baked on, which makes a more durable job. The car has an entirely new color scheme, having a dark blue body with black running gear. The headlights are now in front, in place of on the side, and the leg room in front of the seat has been increased to 18 inches at the bottom and 30 inches at the top of the toe board.

In the detailed mechanical changes the gasoline nozzle on the carbureter is improved, and there is a dash throttle which proves a great convenience as far as ease of starting and guarding against stalling are concerned. The brake straps are now provided with two supporting strings which prevent the straps from rattling against the step brace rod. The battery is now carried in a well, which holds the cells vertically instead of horizontally.

In the new model car the axle has been improved in three details. Two felt washers are now inserted in the ends of the rear axle, which prevent the lubricant from leaking out and covering the braking surface. There is now an oil filler in the differential, which carries the oil directly to the bearings and insures that they are at all times properly lubricated. There is also a through pin for locking the differential pinion carrier, in place of a set screw. Vibration cannot loosen this pin and cause it to fall out. Another feature of the lubrication of the differential and gearbox, which are bolted together in one housing, is the use of an automatic grease level which prevents the grease from collecting in one chamber, thus starving the other of oil.



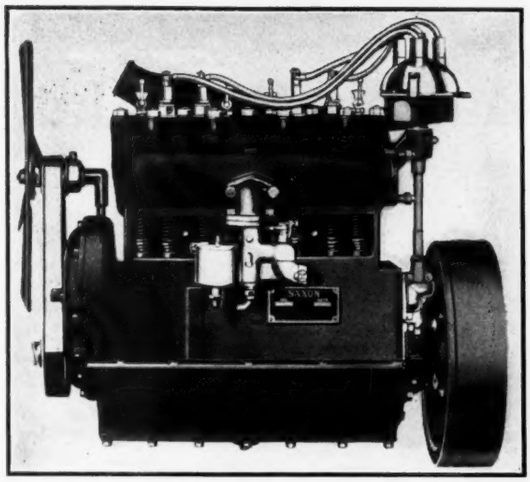
Plan view of Saxon chassis, showing the dust and oil pan, the rear axle gearbox, etc.

Better Material Used Throughout

The steering gear has been improved by the use of better material. The gear pinion shaft is now hardened to make a more lasting job, there is a larger hardened key in the steering gear segment and special carbon steel has been substituted in all of the steering connections in place of the softer material heretofore used. In fact, throughout the entire car there will be found a considerable improvement in the quality of material. In the clutch yoke there was formerly a malleable casting, while now it is a forging with hardened points. On the starting crank there is a collar in place of a pin, and instead of washers under the motor, steel shims are now used. The blades on the fan are now reinforced and there is a jamb nut on the fan support locking screw, which prevents the fan from working loose. The screw on the timer for locking it in place has now a hexagonal

head in place of the filister head previously employed. There are now reinforcements at the rear end of the engine pan to prevent sagging or cracking. The handles on the gearshift and brake levers are other improvements.

The power plant of the Saxon is a four-cylinder motor of L-head design with the cylinders cast in a block and carrying the crankcase integral. The bore is 2.625 and the stroke 4 inches. The valves have steel stems and cast-iron heads, and the crankshaft is a drop forging carried on two bronze bearings lined with babbitt. The camshaft is also a drop forging, having a diameter of 1 inch and carrying the cams integrally. It is operated by helical timing gears from the front.



Valve side of Saxon motor for 1915. Note thermo-syphon cooling

The motor is oiled by a vacuum-feed system which provides a constant level in the crankcase by always keeping the oil at the same height as the feed standpipe. In order to eliminate any chance for air leaks in the oil tank there is a new oil tank filling plug which contains a leather washer recessed into it, which acts as an effective packing, making the tank airtight and preventing too rapid flow of the oil.

Atwater Kent Ignition System

Ignition is accomplished by a six dry cell battery system, using the Atwater Kent distributer. Cooling is by thermo-syphon, the radiator being tubular and aided by a belt-driven fan. The carbureter is the latest Mayer, having adjustments for air and gas on the dash. The fuel feed is by gravity from a 6-gallon tank located under the cowl and having its filler cap projecting through the cowl, an improvement over the arrangement in the original car.

The gearset is carried on the rear axle and provides two selective speeds, forward and reverse. It is mounted on Hyatt roller bearings in the case of the main driveshaft, and in the other bearings hardened steel or cast iron is used. One universal is used on the driveshaft, and the torque tube is carried concentric. The torque tube terminates in a forked yoke at the forward end. The steering gear is a bevel gear design with a sector and pinion. The steering post is a steel tube 1.25 inches in diameter, and the wheel has a diameter of 16 inches.

The rear axle is semi-floating and has a pressed-steel housing. The outer end of the driveshaft is carried on Hyatt roller bearings, and the differential is a two-pinion type with plain bearings. The front axle is a single-piece drop forging I-beam section, heat-treated, carrying ball bearings in the hub. The brakes are 8 inches in diameter, lined with Thermoid for service purposes, and the emergency set is steel on steel, 7 11-16 inches in diameter. Both brakes are carried on the rear wheels and both have a 1.25-inch face width. The springs are cantilever design, both front and rear, with the main leaves vanadium steel. Both are 1.5 inches in width, the front 22 inches long and the rear 23 inches long. The wheelbase is 96 inches. The wheels are wire and carry 28 by 3-inch clincher tires. The equipment includes a top, windshield, two acetylene headlights, oil tail light, generator and horn.

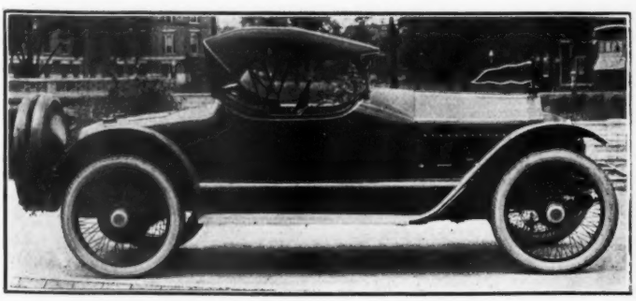
The new battery mounting is a feature of improvement, the placing of the cells in a well rendering a vertical position possible. The cells are held more rigidly, their life is increased and the connections cannot come off.

Makes National Runabout a Sleeping Car

Dr. LeGear, of El Paso, Tex., who owns extensive properties in southwestern Texas, found it inconvenient to travel among them because of the distance and poor train service.

In order that he might travel in comfort he had constructed by the National Motor Vehicle Co. an automobile sleeping and camping car. This roadster has every requisite for camping, being so constructed that a regular pullman bed can be made in the car. Wash basins, cooking arrangements and everything needed by the camper have been provided.

The special body has been constructed on a powerful National car. Special reserve tanks placed under the frame carry a total of 65 gallons of gasoline and 12 gallons of oil. This makes it possible for the National to travel more than 600 miles without taking on any additional fuel supply. The car is finished in light green, with gold trimmings and a large gold star, which is the insignia of Texas.

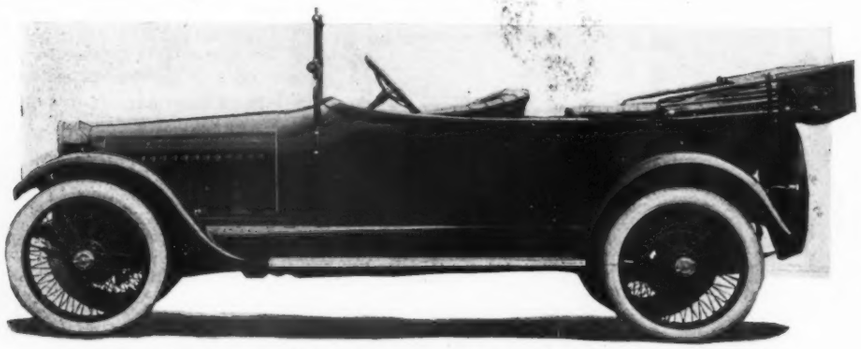


National Roadster fitted with special sleeping body

View showing the method of converting roadster into sleeping car

Chalmers Master Six Has Boat Body

Light Six Also Continued for 1915— Pressure and Gravity Fuel Feed— More Complete Equipment



Chalmers Master six phaeton for 1915. Note new boat-type streamline body

CHALMERS will continue the two sixes which made up the 1914 line for the coming season. The two cars have been refined at a number of detail points and on the larger chassis a touring body of entirely new design has been fitted. The larger of the two sixes, known as the Master six, was introduced last September, and the light six at the time of the New York show in January. The two present designs are refinements of these two models.

Mechanically the cars are fundamentally the same as in the previous models. The cylinder castings have exactly the same interior dimensions, but the core work has been altered to give better waterjacket space on both models. The gasoline feed system has been altered to a combination pressure and gravity feed. The gasoline is forced by pressure to a small tank on the dash of the car and it then flows by gravity to the carbureter. This arrangement has permitted a slight elevation of the carbureter with better accessibility than last year.

New Rayfield Carbureter

The carbureter itself is different and is now the latest model G Rayfield. Carburetion has also been assisted by increasing the waterjacket space around the intake manifold and also by the better waterjacketing arrangements provided by the new carbureter.

The same type of clutch is used on the new cars, that is a multiple disk with cork inserts, but now the disks alternate bronze and steel, whereas in the previous cars all the disks were steel. The gearbox remains the same, except that second gear on the light six now has a greater reduction. On the light six another change has been made in the fitting of Timken bearings on the front axle. The axles on the Master six have not been changed as to general design, but have been weighted up somewhat to follow the lesson learned on the racing track of making the unsprung weight as much but no more than necessary to have the car hold the road. The speedometer drive on both cars is now the inclosed Empico.

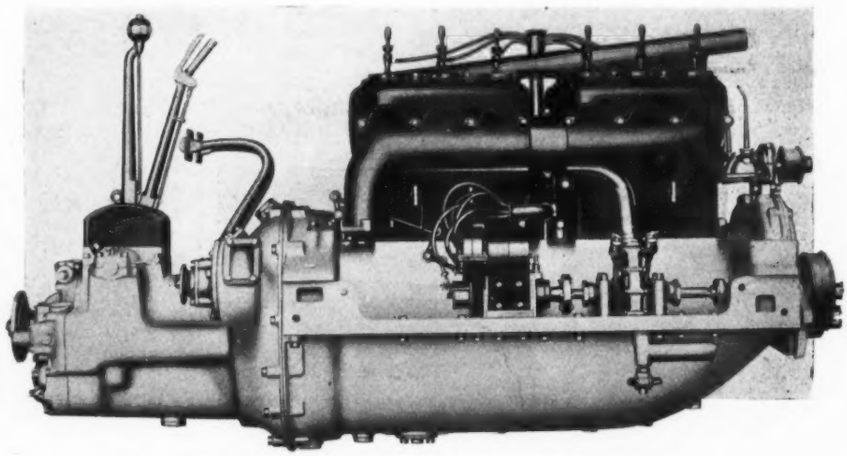
Better equipment will be found on both sixes than on their predecessors. A new design of top which has been worked out in the Chalmers shops is fitted. The storage battery is an improved design having more sealing compound and better separators, which are designed to eliminate buckling of the plates.

A volt-ammeter has been added to the equipment of the dash. The electric switches are also changed in design and a Yale lock is fitted. The appearance of the instrument board has been improved by a rearrangement of the instruments. The tires are larger on the light six. They are now 34 by 4.5 inches, whereas in the preceding cars they were 34 by 4.

Boat Line Body on Master Six

In the body work the cars have been brought up to date in every particular. On the light six there are five bodies listed; these are a five-passenger touring, six-passenger touring, limousine, coupelet and sedan. On the Master six chassis there are two bodies, a seven-passenger touring and a phaeton.

The seven-passenger touring body on the Master six is an innovation for the Chalmers company. It is built on boat lines, carrying the streamline form idea throughout. It has two doors and a passageway between the driver's seat and the seat of the passenger who sits next to him. The driver's seat is adjustable and taken into consideration with the adjustable pedals that are now fitted on all models, a perfect fit can be secured for the driver. There is a ventilating arrangement on the cowl which can be raised and lowered from the driver's seat. This deflects the draught so that it freely circulates about the front compartment of



Exhaust side of Chalmers Master six unit power plant for 1915

the car instead of only reaching the feet of the occupants. This model sells for $2,400. The five-passenger little six is $1,850. This is a raise in price of $125 on the big six and $50 on the light six.

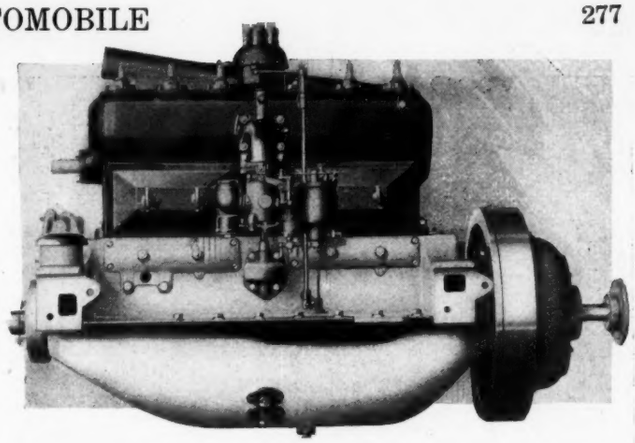
Cars of Similar Design

Both sixes follow along similar lines of design in many particulars. Chalmers made its début into the ranks of the T-head manufacturers last September and now builds nothing but that type. Both chassis have six-cylinder T-head power plants, but the larger car has the cylinders cast in blocks of three, while the smaller one has all the cylinders cast together. The cylinder castings now provide an exceptional amount of cooling space over the heads of the cylinders and around the valves. The intake valves are on the left side and the exhaust on the right.

The cylinder dimensions of the larger six are 4 by 5.5. The smaller six has 3.5 by 5.5-inch cylinders. The S. A. E. ratings of the two models are respectively 38.4 and 29.4. The makers claim dynamometer outputs of 74.3 and 53.4 horsepower for these motors. Last year the Chalmers reciprocating parts were lightened to a large degree and this year the light parts are continued. There is a standing offer in the engineering department of the Chalmers company of a dollar a pound for the reduction of weight anywhere throughout the car. Very close attention has been paid to this feature, but nothing further has been cut in the new cars. The connecting-rods are I-beam drop forgings of open-hearth steel.

Four section-type piston rings are carried. These rings are made up of two parts, the outer ring is complete and inside this there are a number of arc-shaped pieces which form a complete inner ring. Each of the small segments is forced outward by a small leaf spring giving an equal compression all around the cylinder. The crankshafts are drop forgings from .40 carbon steel. They have the crank throws curved so as to bring the center of gravity of the shaft directly on the axis, thereby making for a perfect running balance.

The crankshaft bearings are the same as in the 1914 models, being composed of bronze with babbitt bushings. The bearings are three in number. On the Master six the bearings are 2.125 inches in diameter. The main bearing dimensions for the light six are as follows: Front bearing, 2 3-16 by 2 1-4 inches; center bearing, 2 1-4 by 2 3-8; rear bearing, 2 5-16 by 3 1-2; valve size, 1 15-16 inches.

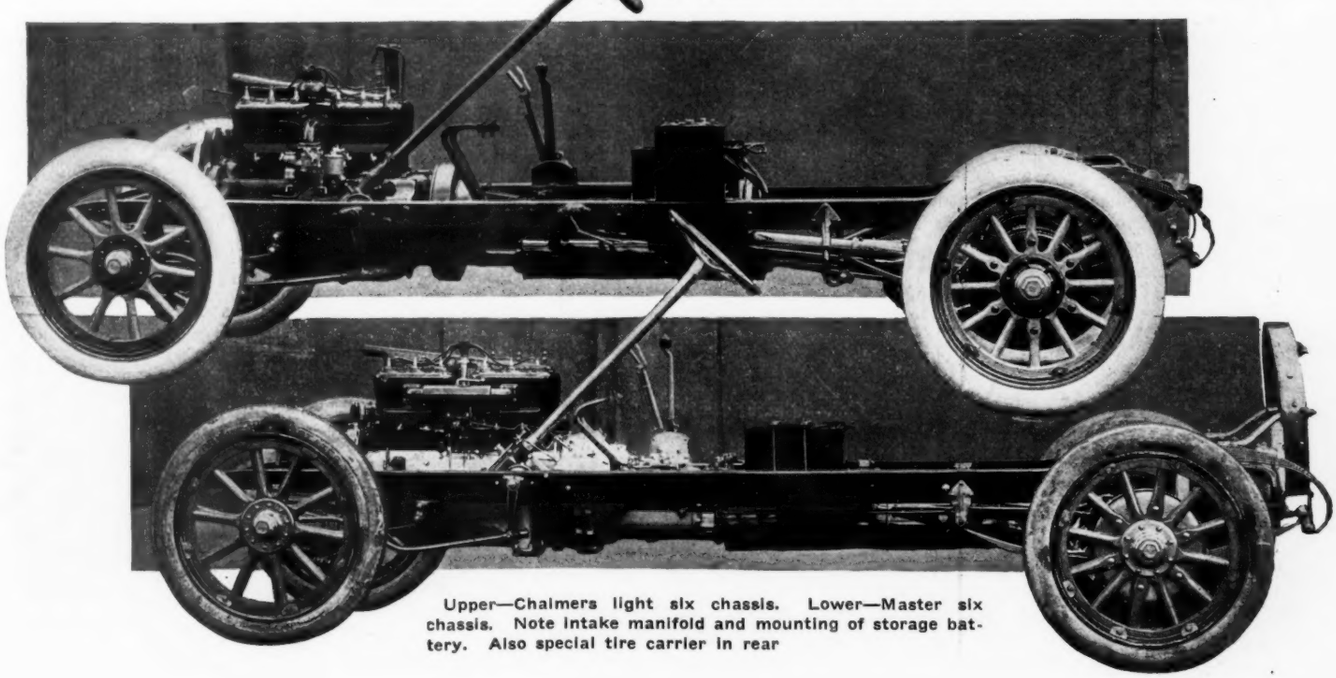


Motor used on 1915 Chalmers light six. Note new carbureter

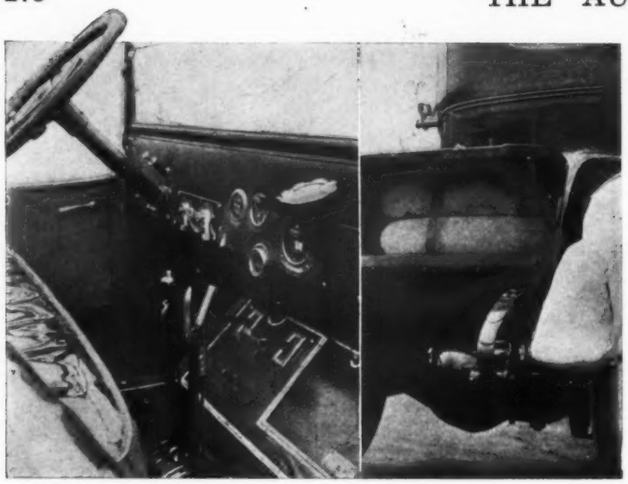
Valves Are of Tungsten Steel

Both the intake and exhaust valves on both models are of tungsten steel. They are driven by separate camshafts, which carry the cams integrally. On the Master six valves are 2.125 inches in diameter and on the light six they are 1 15-16 inches. This gives a very liberal space for the passage of the gases and is one of the features which makes for a high power output on the dynamometer.

The oiling system is essentially the same as that introduced into the Chalmers line in the 1914 design, the only change being in the increase of the size of the oil stream to each of the main bearings from .25 inch to .375 inch. In this oiling system there is a gear pump in the crankcase which takes the oil from the reservoir and forces it through a lead that runs the entire length of the crankcase. From this lead the oil is tapped off at each of the main bearings. The amount of oil that passes to the main bearings is far in excess of what is necessary for their lubrication and the overflow is carried by means of small pipes into troughs beneath the throws of the connecting-rods. The scoops on the ends of the connecting-rods dip into the troughs and the splash lubricates the cylinders. The oil that falls from



Upper—Chalmers light six chassis. Lower—Master six chassis. Note intake manifold and mounting of storage battery. Also special tire carrier in rear



Left—Instrument board and control features of light six Chalmers. Right—Tire compartment in rear

the troughs and the excess from the splash returns to the sump in the bottom of the crankcase, from which point it is again circulated.

An additional oil strainer has been added to the lubrication system. It is mounted on the side of the crankcase and is so arranged that all the oil that is re-circulated passes through it.

Series-Parallel Dimming Switch

Outside of detail features such as a new series-parallel dimming switch the fitting of a volt-ammeter on the dash and the improved battery, the electrical equipment of the cars for the 1915 season is the same as that on the 1914 models. The Chalmers-Entz system is used for starting and lighting on both the Master six and the light six. For ignition there is a Bosch magneto on the larger car and on the smaller the ignition is a battery system with the Atwater Kent distributer.

The Chalmers-Entz motor-generator which met with a great amount of favor last year is continued without change for this season. The motor-generator is still placed in its novel position beneath the right front seat and is driven by a short propeller shaft which extends to the flywheel. It is carried on a bearing at the forward end, and on the front extremity of the shaft there is a small sprocket wheel which is connected by a silent chain to a sprocket on the flywheel. The reduction between these two sprockets is 2.6 to 1.

When acting as a motor the motor-generator is capable of spinning the engine at 100 revolutions per minute under average conditions. When acting as a generator it starts charging the storage battery at a car speed of 8 miles an hour. The generator attains its maximum charging rate at 18 miles an hour. At that time the rate of charge is 15 amperes. The voltage at which the entire system operates is 18. The electrical equipment is largely made in the Chalmers factory. The motor-generator is a product of the Chalmers shops; it is suspended in a very substantial manner by means of a pressed-steel bracket hung from the frame side member. The battery is supported in a similar manner.

New Two-Jet Rayfield Carbureter

The new Rayfield carbureter used on the Chalmers models was described in THE AUTOMOBILE for July 23. It is a two-jet design having three air openings, one of which is fixed and the other two governed by the requirements of the motor. The primary jet supplies all the gasoline while the motor is idling. As soon as it picks up sufficient speed to open the auxiliary air valve a metering pin which is inter-connected with this air valve comes into operation and the secondary jet is opened.

Although the disks have been changed and now alternate bronze and steel, the design of the clutch has not been changed in any other particular. The clutch is operated in oil and has cork inserts. It is a pure multiple disk design.

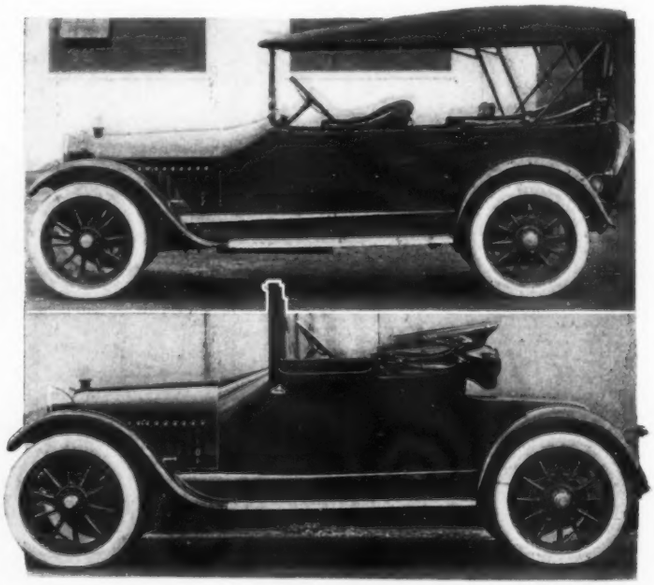
On the Master six the clutch and gearbox housing is bolted to the rear end of the crankcase as a unit. The gearbox provides four forward speeds. Both the clutch and gearbox can be reached by means of hand-holes which are fitted by cover plates in the housings of the clutch and gearbox. On the light six the multiple disk clutch is used also. The gearbox provides three speeds forward.

The rear axles are floating with a single-piece pressed steel housing. Heat-treated nickel steel is used for the axle shafts and for the driving pinion and large differential bevel gear, 3.5 per cent. nickel steel is also employed. The bearings in the rear axles are Timken rollers.

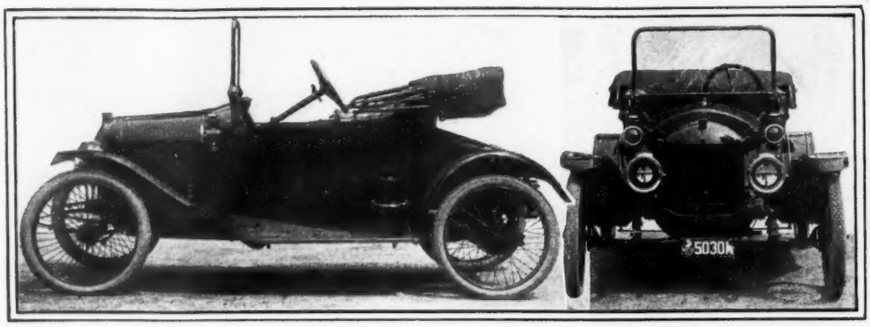
Equipment a Special Feature

The spring suspension remains as it was; the rear springs are three-quarter elliptics. The improved method of suspension adopted on the larger six when it was first introduced has been continued. Instead of the usual spring hanger the springs are bolted directly to the rear of the frame members. The rear springs are underslung and the design has been worked out to permit of the maximum spring action without bumping. Vanadium steel is used in the main leaves of the springs.

The equipment of the cars has been given careful consideration. The speedometer drive is now the Empico inclosed type, the top is easily handled and makes a tight fit against the vertical windshield. The latter is also changed in design, and on the limousine body there is a double glass that provides an extra shield for rain vision. With this shield the designers claim that the heaviest snow will not interfere with vision. The Master six has 132 inches wheelbase, while the light six has 126 inches. The wheels on the larger car carry 36 by 4.5-inch tires, while on the lighter car they carry 34 by 4-inch tires. Wide doors, with concealed hinges, are a feature of the line of bodies on both. The inclosed cars are particularly luxurious, with attention to the smallest of details, such as cigar lighters, etc. The coupelet, which is a rapidly convertible type, is continued. Tires are carried on the rear of the car in the touring designs and under the rear deck in the roadster.



Upper—Chalmers light six seven-passenger car selling at $1,900. Lower—Light six coupelet listed at $2,100. This is a rapidly convertible car. Tires are carried under the rear deck



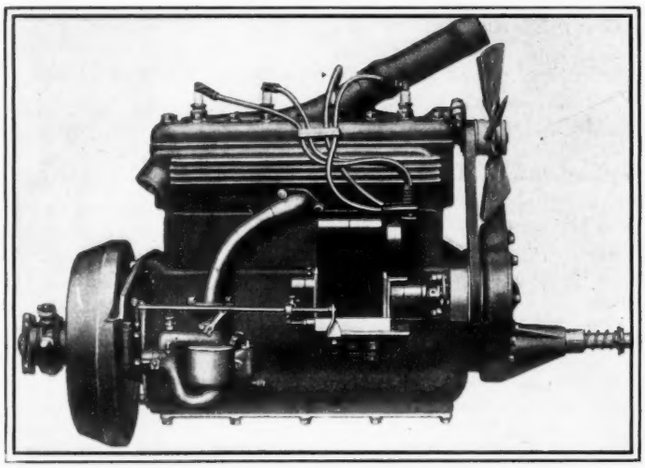
Left—Side view of Grant. Right—Front view showing modified streamline design

Grant Cuts Price $70 for 1915 —Modified Streamline Body

All Important Features Continued as in 1914—Electric System Fitted at Extra Cost

PRACTICALLY a continuation of the same model as brought out last season, the Grant Motor Co., Findlay, O., has cut the price of this little car from $495 to $425. This price cut is due to increased production and is in line with the statement made last January that when the production passed a given amount the price would be cut.

The Grant car is a typical light car design. It has a four-cylinder power plant with the cylinders and crankcase cast together. The inlet and exhaust passages are also included in the cylinder casting and, together with the inclosed valve action, give a very clean appearance to the exterior of the motor. The Grant company claims an output of 21 horsepower with the 2.75 by 4-inch cylinders. While completely inclosed the motor has been made accessible by the use of a large removable plate at the top of the cylinders, for cleaning cylinders and pistons without removing them. A removable plate is also placed on the base of the motor to permit of adjustment of the main and connecting-rod bearings.



Side elevation of Grant four cylinder motor for 1915

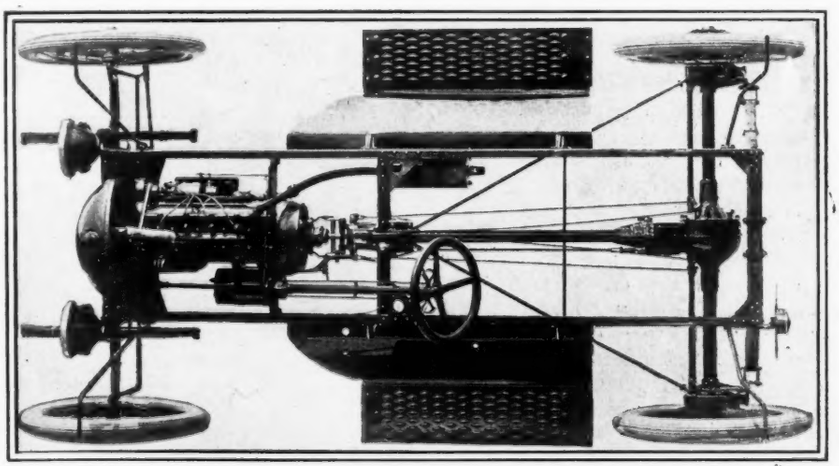
Both the crankshaft and camshaft are drop forgings from alloy steel. The bearings of these shafts are lubricated by constant level splash, oil being fed to the crankcase supply by an automatic drop feed. The carburetor is hung at the rear right end of the motor and is kept low to insure a positive gravity feed. The heat radiated from the crankcase assists in the vaporization of the fuel as it passes up the intake pipe. Ignition is accomplished by single magneto system, the magneto being carried on a shelf at the forward right side of the motor. Cooling is by thermo-syphon and the water pipes are large to permit of a good flow of water through the radiator under all conditions.

Power is transmitted through a leather-faced cone clutch to a two-speed sliding selective gearset. All the gears and shafts are of alloy steel, hardened and ground and are carried on roller and ball bearings. The drive is by propeller shaft with a ball joint torque tube and the rear axle a three-quarter floating design mounted on roller bearings. The entire load of the car is carried on the axle housing, only the driving stresses being transmitted through the axle shafts. The gear ratio of the rear axle is 4.521.

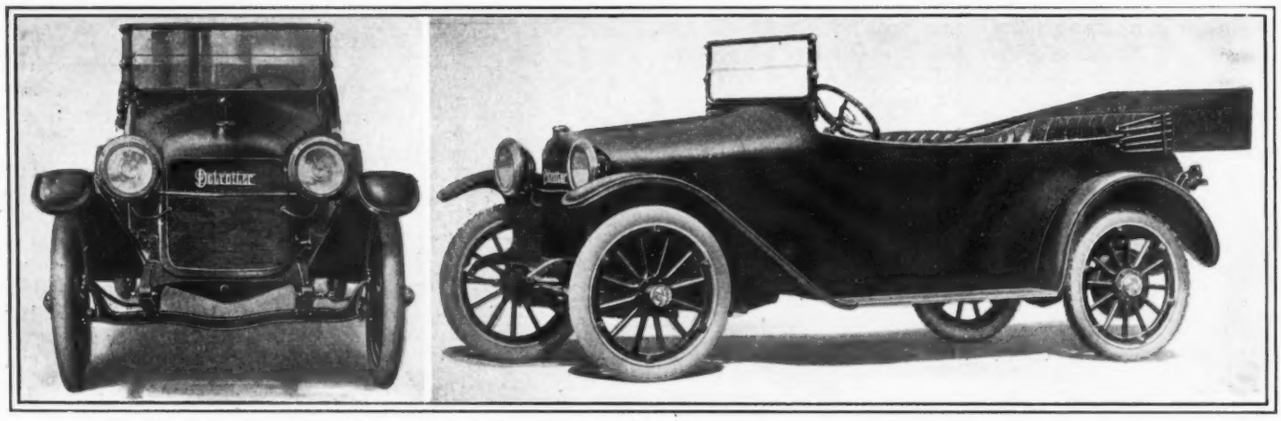
The front axle is a drop forging, having an I-beam section. It is heat-treated and the steering knuckle pins are hardened and ground. The front wheels are carried on ball bearings. Wire wheels are used as standard on the Grant car. They are 28 by 3 and carry Bailey tread tires of this size. Both sets of brakes operate on drums carried by the rear wheels, the foot brake being external contracting and the hand emergency brake internal expanding. The brakes are lined with asbestos babbitt.

Two elliptic front springs are used and one semi-elliptic cross spring on the rear. The road clearance of the car under normal load is 10 inches. Steering is by pinion and gear.

The body fitted to the car is a two-passenger roadster of foredoor design. It has a modified streamline effect, which is accentuated by the round radiator and the cowl dash. The color of the body is black and the chassis and running gear red. The 5-gallon gasoline tank, which the makers claim is sufficient to carry the car for 150 miles, is mounted in the cowl. The weight of the car complete is 1,075 pounds. Standard equipment includes a full set of lights one-piece windshield, top and full set of tools.



Plan view of Grant chassis showing simplicity of design



Left—Front view of 1915 Detroiter, showing streamline design. Right—Side view. Note crowned fenders and boat body lines

Body Improvements Feature Detroiter

Wheelbase Increased from 104 to 112 Inches

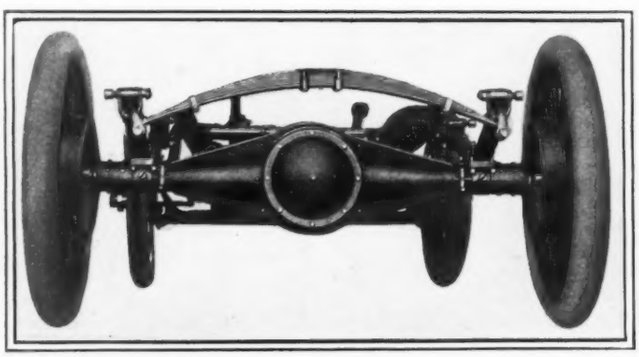
WITH a large number of detail chassis refinements and an entirely new body the Detroiter, made by the Briggs-Detroiter Co., Detroit, Mich., will be continued for 1915 fundamentally the same as for 1914. The motor and all the important dimensions of the chassis except the wheelbase remain the same, but the general appearance of the car is greatly altered. The price continues to be $1,050.

The story of the more important changes in the car is told by the fact that the wheelbase has been increased from 104 inches to 112 and the weight still remains the same at less than 2,300 pounds. This has been accomplished by an entirely new design of body, the use of drop forgings in place of castings for the levers, etc., and a light one-man top.

Carbureter Is 4 Inches Higher

On the motor the carbureter has been raised 4 inches. This is rendered possible by placing the gasoline tank under the cowl. The motor support has been changed and, while it remains a three-point suspension, it now has a full cross member to take the rear supports and a new type of front support which permits the motor to be lifted out directly instead of having to be moved back 2 inches before being removed. The starting motor now bolts directly against the front of the motor whereas last year it was held on a separate shelf. This year the starting and lighting outfit has been changed and while operating at the same voltage and with practically the same connections it is a Westinghouse.

The appearance of the front of the car has been improved by a round radiator which moulds continuously into the body lines. A mud shield has been added to the bottom of the radiator. The rear appearance of the chassis is changed by removing the bracket for the rear platform spring perch and in its place the spring is supported directly by the rear frame cross member. The springs have had an extra leaf added to them. The front now have seven leaves, the rear side, seven and the rear platform eight. Step hangers are supported directly by the body.



Rear axle construction of 1915 Detroiter. Note platform spring

Oil Level Warning Light

The brake and clutch pedals are now adjustable for length. The steering gear is a Gemmer ball bearing design and is fully adjustable for wear. In the 1915 car the Detroiter will be fitted with a muffler cutout and accelerator pedals. The instruments, including the bank of electric switches, gasoline gauge, voltmeter, speedometer, instrument light and oil-level warning light are all on an aluminum plate fitted to the cowl board. The oil level warning light is an innovation this year. When the level in the crankcase reservoir drops to a dangerous degree, a metal float makes an electric contact and the red lamp on the dash lights up telling the driver that it is necessary to replenish his supply.

It is in the body work that the most marked change is made. The car has a very distinctive streamline boat-like form. The body is 1.5 inches lower than before and follows the line of the car, starting from the new rounded radiator to the rounded-off stern. The running boards are kept free, the battery box having been removed and underslung from the frame. In the finishing of the body there are now twenty steps as compared to sixteen last year. The doors have been widened to 24 inches. For 1914 they were 16.5. The rear seats are now 45 inches wide in the clear whereas last year they were 41 inches. The body is much more roomy all around with a greater amount of leg space in the front compartment than previously. The windshield is a new attractive rain vision design and fits well with the new one-man American top. The fenders are crowned.

The four 3.5 by 5-inch cylinders are cast in a block. Motor is an L-head design suspended from the frame at three points. The clutch and gearset housings are integral with the crankcase. The pistons are 4.75 inches

in length and are fitted with three eccentric compression rings all fitted above the piston pin. The connecting-rods are I-beams with crankpin bearings which are 1.875 inches square.

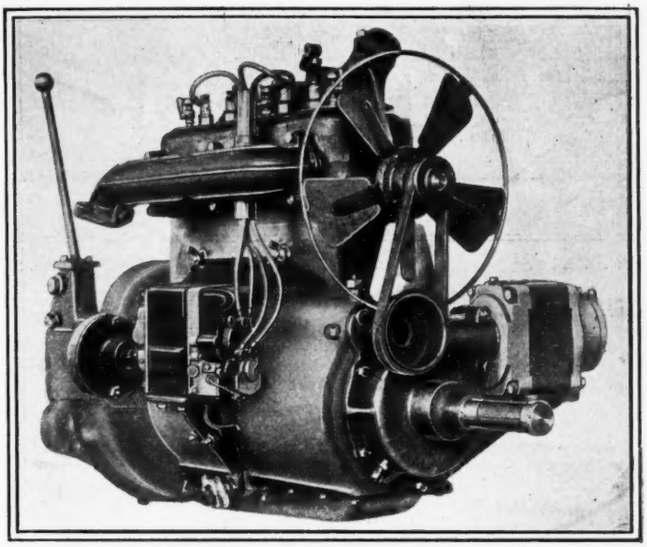
The crankshaft is a drop-forging from high carbon steel and is carried on two annular ball bearings. The camshaft is also a drop forging with the cams integral. These are ground to a limit of 0.001 inch. The bearings for the shaft are 0.937 inch in diameter. The end bearings are 2.5 inches long and the center 1.25 inches. The valves have cast iron heads welded to carbon steel stems. Dust-proof cover plates are fitted over the valve mechanism.

Two per Cent. More Cooling Space

The curved radiator of this season gives about 2 per cent. more cooling space than that used for 1914. The cooling is accomplished by thermo-syphon through large waterjackets, the water intake and outlet pipes having a diameter of 2 inches. Lubrication is accomplished by splash.

Power is transmitted through a twenty-three disk clutch. There are twelve internal and eleven external crucible steel disks which furnish the frictional surface under the pressure of three helical clutch springs. Three forward speeds are provided by the gearbox. The gears used are of high carbon steel and have face widths of 0.75 inch.

The differential and the drive gear assembly form a complete unit and may be removed from the rear axle without disarranging any other parts. A difference in the 1915 model is that the drive pinion is adjustable as well as the large bevel gear of the differential. In the 1914 car only the large bevel gear was adjustable. The differential assembly is carried on two double-row annular ball bearings. The drive ratio at the rear axle is 4 to 1. For 1915 there will be an option offered in this particular. Dealers in hilly territory will be furnished with cars having a gear ratio of 4.33 to 1 if they desire. The axle construction is floating.



Four cylinder 3.5 by 5-inch block Detroit motor

The service brake is 14 inches in diameter and the emergency brake is 10 inches. The wheels are of the artillery type and carry the brake drums. They have twelve 1.5-inch spokes and carry 32 by 3.5-inch tires.

Jeffery Quad Climbs 49 Per Cent. Grade

KENOSHA, WIS., July 29—More than thirty representatives of trade papers gathered at the plant of the Thomas B. Jeffery Co. here today to witness a demonstration of the Jeffery Quad, a four-wheel drive, steer and brake, truck.

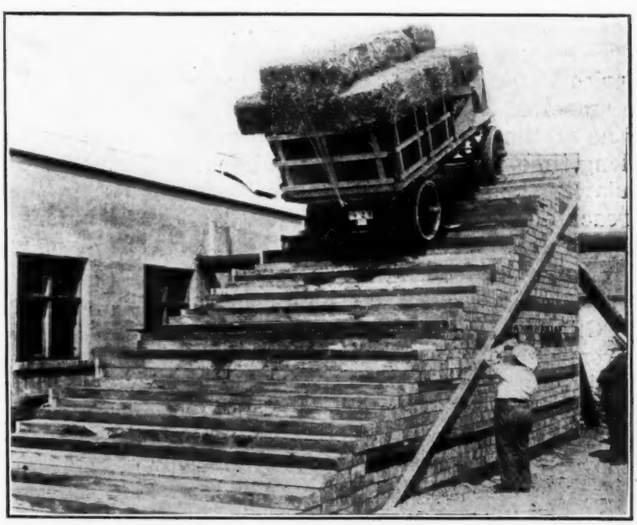
The first spectacle was that of running the truck flush against some wooden planks piled 16 inches high and then mounting the planks, running over them and reversing to the original position. All this was accomplished with a load of approximately 3,000 pounds. Besides demonstrating the truck's ability to mount a 16-inch obstruction it demonstrated that either set of brakes could stop the vehicle in almost any position.

Another test was that of climbing a pile of lumber 16 feet high, in which heavy planks were arranged to provide steps respectively 4, 8 and 12 inches in height. The angle of the slope was 49 per cent., or 44.1 degrees.

After the obstacle-mounting demonstration the truck was driven to a very bad piece of land, one which was full of deep holes and bad ruts. This field was preceded by a ditch about 4 feet deep. The truck went through the ditch easily and then through the field, turning around, reversing and doing innumerable stunts suggested by the spectators. After the list of suggestions had been exhausted the quad was driven into the ditch with the frame of the car touching the opposite side. It pulled out by pushing aside some of the dirt.

Another vehicle of similar construction and carrying a load of 3,000 pounds in the form of steel ingots, showed what could be done with a trailer similarly loaded. The trailer was taken in and out of the ditch, through the field, and in short followed the wheels of the tractor around the same torn-up land as did the other car. A braking test was next staged. The car came around the testing track which is used by the company for testing its chassis at approximately 15 miles per hour and the brakes suddenly set. The car stopped within 8 feet. The Jeffery Quad was then backed against a wall of one of the buildings. The motor was started and the gears thrown into mesh, but the wheels could do no more than spin around.

The Jeffery Quad which made this remarkable showing is of the four-wheel-drive type, with all wheels braking, steering and driving alike. A small high-speed motor, 3 3-4 by 5 1-4 inches, the same engine as is used in the four-cylinder Jeffery passenger car, furnishes the motive power. This motor is mounted under a hood in front of the driver but centered in the floorboards. An exceptionally large radiator is used, which makes the motor bonnet invisible from the front. This engine drives by shaft to a large gearbox from which two shafts extend, one operating the front driveshaft and the other the rear. The driveshafts are parallel to the dead axles. The drive is by internal spur gearing. All four wheels are exactly alike.



Jeffery Quad climbing 49 per cent. grade in factory test

The Automobile

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SPECIAL NOTICE—Mr. W. I. Ralph, vice-president of The Class Journal Co., assisted by Mr. Henry Knott, will have temporary charge of the Detroit territory in place of Mr. L. G. Vogel, whose resignation has been accepted to take effect August 6, 1914.

New Merchandizing Methods

THE announcement in this issue of THE AUTOMOBILE by two different concerns that a refund of a substantial portion of the purchase price would be made providing more than a certain number of cars were sold during the coming year, is one of the most interesting statements made for a long time. It should do a great deal to further popularize the automobile, and will bring it within the reach of more people. Further, it will undoubtedly inspire greater confidence in these concerns, as it is conclusive evidence that they are honestly trying to retail their products at the lowest price.

One of these concerns is a manufacturer and promises to make a refund of 10 to 15 per cent., while the other is a dealer and states that a rebate of $50 per car will be given.

From the viewpoint of the manufacturer this move marks a great advance, and solves in a degree the question of price reduction. No risk is taken on the manufacturer's part. In either case his profit is assured, but if the stipulated production figure is reached the purchasers get the benefit of reduced cost of manufacture.

The dealer's case is similar, his overhead charges are distributed over a greater number of cars and hence the conditional reduction.

This new method of merchandizing should prove a success, and its progress will be watched with interest, because the principle involved is applicable to many other lines of business and its extension might make an appreciable reduction in the cost of many articles.

A Time for Study

WAR, the greatest evil that can befall commerce of every kind, has already had a perceptible effect upon our export trade. Many of our largest and most active companies have received cablegrams from Europe to the effect that it is no longer safe to ship cars, parts and accessories to Great Britain, our leading customer for these goods, or to the other European countries.

Just when the majority of American manufacturers were beginning to pay serious attention to the great possibilities of foreign markets and in return the foreign markets were beginning to look to American manufacturers as never before in the history of the automobile industry, the precipitation of hostilities gives this growing trade a severe setback. And one of the most unfortunate aspects of the entire situation is that it is not only our trade with European countries which is affected but also that with countries in the East, in South America and other quarters, owing to the fact that the merchant marine of the world is largely owned and controlled by Great Britain and therefore of little service in carrying our exports abroad. Such cars, parts and accessories as we will be able to ship must be carried by either American vessels or those of other countries which are not involved in the European war.

Thus a study of the situation shows that, temporarily at least, our export trade will be terribly handicapped, but the makers must not allow this to make them despair of further developing their market in foreign countries. True, they must concentrate for the present on the domestic market which, owing to the splendid crop conditions reported throughout the ocuntry, is apparently ready to take more cars than ever before. But, while doing this, they must also keep closely in touch with their foreign interests if possible and utilize the interval in active foreign trade by more closely studying its requirements and preparing for an aggressive campaign upon the return to normal conditions.

This is also an opportunity for our makers to secure the business in South America and the Far East, which European makers formerly controlled.

This is a time for study, not only of the foreign market that was, but of the foreign market that is to be upon the close of the war. Conditions will probably vary and requirements may change. The companies which take these things into consideration and study and plan accordingly will be those whose export business will profit in the end.

War Shatters Motor Exports Boom

Detroit Has Two Hopes: That Britain Will Not Be Drawn into the European Battle Royal and That United States Government Will Establish a Merchant Marine to Facilitate Shipments to Neutral Ports

DETROIT, MICH., August 3—The general European war will have a far-reaching effect upon the whole American automobile export business, and no one can at the present time estimate how many millions of dollars will be lost by the Detroit manufacturers, as the local motor-car makers have been providing about 50 per cent. of all the cars exported by this country.

If the war is confined to the continent of Europe and the United Kingdom is not drawn in, the loss will not be so far-reaching, but inasmuch as over 50 per cent. of the exported cars to Europe have been shipped to Great Britain alone, it can be readily seen how great the difference is with England also fighting.

An idea of how the automobile business will be affected can be better gained by showing the United States Government statistics for the 11 months of the fiscal year ending in May. Up to that time a total of 27,018 automobiles had been exported to all countries of the world by the American automobile manufacturers, and the value of these cars was $24,583,435. Out of these 27,018 automobiles 12,521, or 46.3 per cent., having a total value of $9,733,600, or about 40 per cent. of the total value of all cars exported, were shipped to Europe.

From the information gathered at the Detroit automobile plants it is safe to say that fully 65 per cent. of the automobiles exported by this country are coming from the local manufacturers and one or two other Michigan concerns, and the general opinion among these manufacturers is that the war is a hard blow to their foreign business, not only with Europe but with all other countries.

Effect of War Doubtful

"Nobody can predict what the effect of the war will be upon the American export trade in motor cars and parts," said the general manager of one of the big concerns doing a large foreign business. "If the war would be confined to one or two countries, and not include England, the situation would be less gloomy, but with all the big powers engaged in war it will be a long time before there will be any chance of resuming anything like natural business relations with Europe. Even if we had the chance of sending cars over we would not take the risks as the general financial conditions will become such that the people won't have any money to spare except for their immediate requirements and these will not include automobiles. The best thing for the American manufacturers to do now is to develop his home trade and that with Canada and then prepare to supply Europe when Europe will be ready to buy."

One of the officials of the Hupp Motor Car Co., which has one of the biggest foreign automobile businesses in the country said: "There is no question that if the war lasts any length of time the American automobile export trade all over the world will be greatly affected. For a short time South America, Australia and Asia may not be strongly affected but there will be a lack of shipping facilities and the financial conditions will also render the export business much more difficult to handle."

"There will be such a big falling off in the American automobile export business that it will make one think of the time when the first export shipments of American cars were made," said the foreign manager of one of the Detroit manufacturers. "Canada can hardly be called a foreign country and thus the number of cars to be shipped will be very small. If we had a merchant marine it would be different, but now we ship practically 85 per cent. of that which goes to foreign countries on ships flying a foreign flag and about 70 per cent. is divided among British and German ships."

"Most discouraging is this war," said the foreign sales manager of another big local plant. "The American automobile business in Europe had just started to become really important and we had an exceedingly good year abroad with splendid prospects. Now this is only a dream and who can predict when the time will come when the American trade will again be as prosperous over there as it has been during the last 18 months? If Great Britain could have been kept out of the muddle it would be different, but now it is a situation which could not be worse, as far as European trade is concerned, as Great Britain has been the biggest customer this country has had. No doubt can exist that within a comparatively short period the business in motor cars with the rest of the world will also be reduced so much that it will barely amount to anything. The reason will be the lack of transportation facilities, as we have no ships, and the inability of foreign bankers to make settlements."

An official of the Studebaker Corp. said: "The British people control practically all the shipping facilities of the world and with Great Britain drawn into the war the whole shipping system of the world will be reduced to such a small scale that there will be no way of taking care of export trade. But even if we could effect shipments to Europe now we would not take the chances as the risk is much greater that the cars would not reach their destination and be unloaded at the port of arrival and taken to some warehouse or some other place at our risk."

"Last week we had orders for cars from South Africa and from England," said one of the officers of the King Motor Car Co., "but the orders were subject to the shipments being made per American steamers. As we have such a small number of ships flying our flag the situation is a very difficult one. This should be a warning to our government and ought to open the eyes of every American and make him realize what it means when a great, or rather, the greatest of all nations, has no merchant marine of its own.

"One of the principal reasons why the war will greatly affect the whole American automobile export trade," said the spokesman of one local manufacturing concern, "is the fact that in many countries all settlements are made through drafts negotiated through London. This is specially the case with some of the South American countries, Japan and Australia. Many bankers do practically all of their business with London banking houses and with Great Britain at war you can readily see what chances these foreign banks have to transact business with London. Of course there are concerns which have no recourse to London and do their business through New York bankers, but the number is not large and they would be hampered in other ways so that the export business might be considered non-existent for some time."

English Engineers Conclude Belgian Visit

ANTWERP, BELGIUM, July 30—The visit of the Institution of Automobile Engineers to Belgium, which came to a conclusion last week, was probably the most successful of any of the visits hitherto held by the institution. The Minerva Motor Co.'s factory was visited in this city. One of the most striking things noticed in these works was the use which is still made of machinery which might by some be considered somewhat out of date. But any disadvantage there might be, it would appear, is to be fully compensated for by the very low rate of wages which is paid to machinists in Belgium, about $.10 an hour. Other large plants were also visited.

Rates for Charging Electrics Less

NEW YORK CITY, July 30—The reductions in the rates charged for electricity by the New York Edison Co. during the past three years may be taken as conclusive testimony of the increasing use of electric vehicles. Prior to July 1, 1911, the rate averaged approximately 3.5 cents per K.W. hour. Between July 1, 1911, and May 1, 1914, the rate was reduced to less than 3.25 cents, and on May 1, 1914, the minimum rate, based upon the consumption of 50,000 K.W. hours monthly, was lowered to 2 cents a K.W. hour. The new rates which are now in force are as follows, these being dependent upon a minimum monthly bill of $25:

The first 2,500 kilowatt hours monthly at 5 cents; next 2,500 kilowatt hours monthly at 4 cents; next 5,000 kilowatt hours monthly at 3 cents; next 20,000 kilowatt hours monthly at 2½ cents; next 20,000 kilowatt hours monthly at 2¼ cents; excess over 50,000 kilowatt hours monthly at 2 cents.

Lower Ford Prices $60 to $120 a Car

Revised Profit-Sharing Plan Includes Fixed $60 Reduction and Other Tentative Benefits

DETROIT, MICH., Aug. 1—Prices of Ford cars have been reduced. A plan announced for the coming year will include a sharing of the company's profits by customers. This is said to complete the triangular profit-sharing plan which the company had in mind when the employees were given a portion of the earnings of the company.

Each car has been reduced $60 and is sold with the understanding that if 300,000 cars are disposed of between August 1, 1914, and August 1, 1915, each person who buys a car between those dates will receive an additional discount of from $40 to $60, making a total reduction of $100 to $120 on each car.

Thus the touring car, which has been sold for $550, will sell for $490, and under the conditional plan the price will amount to $450 or $430; the roadster is cut from $500 to $440, with a possible added $40 or $60 discount, and the town car drops from $750 to $690, with the possible added reduction.

The 300,000-car output represents, it is stated, a condition of maximum efficiency in the Ford plants and will make the profit sharing possible. The distribution of about $18,000,000 is entailed.

The reductions in the Ford prices concern only the American Ford company, and the output of 300,000 cars is to be produced by the Detroit plant.

N. Y. Overland Agent Has Profit-Sharing Plan

NEW YORK CITY, Aug. 4—The C. T. Silver Motor Co. has inaugurated a conditional price reduction plan in connection with its 1915 sale of Overlands. If the sales by August 1, 1915, total 2,500 cars, $50 will be rebated to each buyer and a further rebate will be made if the sales reach 3,000. This will entail a disbursement of about $125,000. Silver believes his sales for the year will exceed 3,000.

Government Has Devised Glare Antidote

WASHINGTON, D. C., Aug. 1—The problem of eliminating the glare of motor car headlights, against which municipal ordinances and police regulations in many cities have been placed in force, is to be taken up by the federal government. In compliance with a request of the Automobile Club of America the bureau of standards, department of commerce, has devised a method of accomplishing this result and this method now is being tested. Director S. W. Stratton, of the bureau, has recommended that a patent dedicated to the public be taken on this method.

Director Stratton will not discuss the details of the new method. He believes that more definite announcement should wait the patenting of the method. The bureau is now awaiting the arrival of apparatus needed to complete the tests before taking steps toward obtaining a patent.

Sterling Co. To Build Light Cars

BROCKTON, MASS., Aug. 3—The Sterling Motor Car Co., of Brockton, Mass., successor to the Sterling Motor Co. announces that it will begin at once the construction of 1,000 motor cars to retail, fully equipped, at $650. The company has a plant on Centre street, near Quincy, and states that 500 men will be put to work immediately. Its output for the 1915 season will be at least 5,000 cars, according to the officials of the company.

S. A. E. Council To Meet August 24-25

NEW YORK CITY, Aug. 4—The next Council meeting of the Society of Automobile Engineers is to be held August 24 and 25 at which the question of the European trip will be decided and other important matters considered. It is the idea of the officers of the society to await developments in Europe before deciding as to whether or not the European trip will be held. On August 15 the ballots will be counted in the voting as to the amendment of the constitution.

Several division meetings are in prospect, one of which will be the Electric Vehicle division. The Standards Exchange division will also meet to take up matters with the engine builders. Two respects in which standardization will be sought are in bell housings for attaching gearboxes to unit power plants and housings for attaching gearboxes to rear axles. In both these particulars there is a woeful lack of uniformity at present.

E. V. A. A. Membership Is Doubled

NEW YORK CITY, July 30—The Membership of the Electric Vehicle Assn. of America has increased about 100 per cent. since last October. Last October the membership was 437, while it is now approximately 850. The sectional representation has expanded until it now includes New England, Chicago, Philadelphia, Washington, Cincinnati, San Francisco, Los Angeles, Pittsburgh, New York City, Detroit, Cleveland and Toronto with expectations of having local sections in the immediate future in Buffalo, St. Louis and three or four other cities.

Service Bureau for Motor Truck Club

NEW YORK CITY, Aug. 3—The Motor Truck Club of America plans to operate a Legal Aid Bureau during the coming year. It will distribute copies of laws to club members, establish a school of instruction for drivers, appear in court for traffic offenders, act as legal adviser, recommend support or condemnation of proposed legislation, prepare proposed laws, gather statistics and act generally in behalf of club members.

To Build Trucks and "Cykes" in Orange, Mass.

ORANGE, MASS., Aug. 3—The old plant at Orange, Mass., used for many years by the Grout Automobile Co. for manufacturing Grout cars, has just been leased by the Orange National Bank, its owners, to a syndicate that proposes to form a corporation that will build light trucks and cyclecars. The factory has been leased for a term of years with an option to purchase the place at the expiration of this period. The new company plans to use the entire factory and it expects to begin operations in September when an announcement will be made.

Monroe Co. To Make $450 Two-Seat Light Car

FLINT, MICH., Aug. 1—A two-passenger light car to sell at $450 will be made by the Monroe Motor Co., which has been organized and incorporated with a capital stock of $250,000. The plant formerly occupied by the Imperial Wheel Co., in this city has been secured and manufacturing operations will start at once so as to begin deliveries beginning September. The first year's output is expected to be of about 5,000 cars.

The board of directors consists of R. F. Monroe, for the last three years with the Chevrolet Motor Co.; W. C. Durant, of the General Motors Co.; Arthur G. Bishop, president of the Genesee County Savings Bank; A. B. C. Hardy, general manager of the Chevrolet Motor Co.; R. T. Armstrong, of the Armstrong Mfg. Co.; Curtis R. Hathaway, of New York. Mr. Monroe is president and general manager of the new concern.

Wagenhals Experimenting with Small Car

DETROIT, MICH., Aug. 2—The Wagenhals Motor Car Co. is carrying on extensive tests with an experimental car about half the size of the machine it is manufacturing. The little machine resembles the larger one in that it has three-wheels, one in the rear. Its carrying capacity is between 400 and 500 pounds and the price will be about half of the present model. It carries a four-cylinder motor 2.75 by 4 inches.

Stepless Electric Bus Test in New York

NEW YORK CITY, Aug. 3—Regular 125-mile-a-day trips are being made in New York city by the Field stepless electric bus, with a view of proving its practicability. The New York Omnibus Co. has applied to the board of estimate for a franchise to operate Field buses on regular lines.

In its demonstrations the bus has been climbing hills of 10 per cent. grade.

In the run of 125 miles daily the bus is said to use up 220

kilowatts. The vehicle is charged for 5 hours at night and is given a 10 minute boost at the end of each 15-mile round trip.

Knox Motors Company Is Active

NEW YORK CITY, Aug. 4—In THE AUTOMOBILE for July 16, among companies which were mentioned as being out of business were the Knox Automobile Co. and the Knox Truck. These concerns have nothing to do with the present Knox Motors Co., which is actively engaged in the manufacture of passenger cars, tractors and motor fire apparatus at Springfield, Mass.

Paige Cuts Car Prices $50 and $80

DETROIT, MICH., Aug. 5—*Special Telegram*—The price of the 1915 Paige-Detroit has been reduced to $925 on model 25 and $1,195 on model 36, or, respectively, $50 and $80 less than 1914 prices.

Powers Want Federal Trucks

Federal Motor Truck Co. has been asked per cable by several European countries now at war how soon a large number of trucks could be furnished. The company has taken up the matter with the U. S. Government to find out if the declaration of neutrality will prevent such shipments.

New Denby Truck on Overland Test

DETROIT, MICH., Aug. 1—The first of the new trucks made by the Denby Motor Truck Co., of this city, started on an extensive test and advertising trip yesterday en route to Philadelphia over the Michigan and Ohio roads. Sales Director R. P. Spencer and C. D. Chenever of the export department of the Denby company are making the trip on the truck.

Signal Flags at Crossings, New Traffic Plan

NEW YORK CITY, Aug. 3—Regulation of traffic by means of flags has been tried out in New York city on Fifth avenue at Forty-second street. By raising a flag a traffic officer indicated the direction of traffic, and the same signals were given on other corners within view of the man with the flag, thus causing traffic to flow north and south at the same time and east and west at the same time on streets within the signalling area.

Market Reports for the Week

By far the most important event of the week as far as the prices of materials are concerned was the $0.27 rise in the price of tin, due to the rumor that Great Britain had barred exports of metal from the British Isles. The price is now 58 cents and will probably go higher as it seems only a question of supply and not of price. There has been practically no change noted in the other materials.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Beams & Chan-							
Antimony	.05¼	.05¼	.05¼	.05¼	.05¼	.06	+¾
nels, 100 lbs....	1.31	1.31	1.31	1.31	1.31	1.31	.....
Bessemer Steel,							
ton	19.00	19.00	19.00	19.00	19.00	19.00	.....
Copper, Elec., lb..	.12⅞	.12¾	.12⅝	.12⅝	.12½	.12⅜	—½
Copper, Lake, lb..	.13	.12⅞	.12¾	.12¾	.12⅝	.12½	—½
Quotations on cottonseed oil closed on Friday. Wednesday it sold for $6.92 and Thursday for $7.05.							
Cyanide Pot-							
ash, lb.....	.17	.17	.17	.17	.17	.17	.....
Fish Oil, Men-							
haden, Brown..	.40	.40	.40	.40	.40	.40	.....
Gasoline, Auto,							
bbl.	.13	.13	.13	.13	.13	.13	.....
Lard Oil, prime..	.93	.93	.93	.93	.93	.93	.....
Lead, 100 lbs....	3.87½	3.87½	3.87½	3.87½	3.87½	3.87½	.....
Linseed Oil.....	.60	.60	.60	.60	.60	.60	.....
Open-Hearth							
Steel, ton.....	19.00	19.00	19.00	19.00	19.00	19.00	.....
Petroleum, bbl.,							
Kans., crude...	.75	.75	.75	.75	.75	.75	.....
Petroleum, bbl.,							
Pa., crude.....	1.65	1.65	1.65	1.65	1.65	1.65	.....
Rapeseed Oil,							
refined	.59	.59	.59	.59	.59	.59	.....
Rubber, Fine Up-							
River, Para....	.72	.72	.70	.70	.70	.70	.....
Raw Italian silk quotations closed on Monday. The selling price on the preceding Thursday was $4.90.							
Quotations on raw Japan silk stopped last Monday. The price for the preceding Thursday was $4.22½.							
Sulphuric Acid,							
60 Baume.....	.90	.90	.90	.90	.90	.90	.....
Tin, 100 lb.....31.00	30.75	48.00	48.00	48.00	58.00	+27.00	
Tire Scrap.....	.04¾	.04¾	.04¾	.04¾	.04¾	.04¾	.....

Detroit Ships 44,500 Carloads in 6 Months

Nearly 67 Per Cent. as Many Cars Shipped as in Twelve Months of 1913

DETROIT, MICH., August 4—During the first 6 months of 1914 a total of 44,500 carloads of automobiles have been shipped out of Detroit, the total number of automobiles being estimated at 189,125. During the 12 months of 1913 the total number of carloads of automobiles shipped by Detroit manufacturers totaled 66,450, the number of automobiles shipped in them being estimated at 282,412. Thus in 6 months of this year the number of carloads of automobiles handled by the railroads running into Detroit amounts to nearly 67 per cent. of the total they handled all last year.

The 5 per cent. increases in freight rates accorded the railroads by the Interstate Commerce Commission for the territory between Buffalo and Pittsburgh and the Mississippi river, affects especially the Detroit automobile manufacturers, according to traffic expert A. T. Waterfall, of the Detroit Board of Commerce, who stated that about 60 per cent. of the total tonnage of the railroads running in and out of Detroit concerns coal and coke, which are among the commodities upon which no increase of freight has been allowed, while of the remaining 40 per cent. of tonnage the automobiles come in for the larger proportion.

Many Concerns Hold Up Foreign Shipments

Information obtained by the Detroit Board of Commerce shows that among the forty big local manufacturing concerns which have received cable instructions to withhold all further shipments to Europe, are the manufacturers of the Chalmers, Ford, Hudson, Hupmobile, Krit, Lozier, Packard, Saxon and Studebaker cars and of the Continental motors.

BOSTON, MASS., Aug. 1—The Leghorn Sales Co., of which George R. Leghorn is president, has been formed to act as distributors for the Lozier cars in New England. Salesrooms will be opened on Boylston street.

No Securities Quotations This Week

NEW YORK CITY, Aug. 4—Owing to the war conditions existing in Europe the New York Stock Exchange has been closed and there is no trading in securities.

In a recent cave-in of a street in Paris a taxicab was carried into the hole. The illustration shows the removal of the wreck

Gathering of nearly 500 Chalmers dealers at the factory of the company in Detroit. The meeting was very enthusiastic and a material increase

"All 1914 Cars Sold"—"Many 1915 Orders," Say New York Dealers

Branches and Agencies Find No Depression, Reporting Record Business—Buick's Extraordinary Sales—Trade Has General Gain of 50 Per Cent. Over Same Period Last Year

NEW YORK CITY, July 27—Dealers in this city report a very successful year for the sale of their 1914 model cars. A majority of the agencies are far ahead of the 1913 sales—on an average, approximately 50 per cent. The much discussed business depression does not appear to have affected them.

Many of the firms are sold out and are still having many calls for the 1914 product, which they cannot satisfy, as the factories are also all sold out and are about to announce their 1915 models.

The dealers look forward to a good business for 1915 models, one agency having already delivered 100 cars, with a standing order of 100 more. One firm sold eighteen cars retail on July 23, the largest day's sale in its history. The same firm reports the biggest year and the best outlook.

Most of the dealers have large territories, including most of New Jersey, Long Island, part of Connecticut, several counties in this state, also Staten Island, the Metropolitan district and Pike County in Pennsylvania.

Just what each dealer did last year is shown in the following extracts, giving in some cases the total sales and also the percentage of increase for the first 6 months of this year in comparison with the same period during 1913:

Buick—Biggest year it ever had, with a splendid outlook for 1915. Was sold out on May 1, 2 months earlier than last year. Sold 360 of the 1914 cars. Has sold 100 of the 1915 cars and has a standing order for 100 more. On July 23 sold eighteen cars, the largest day's sale in its history.

Cadillac—All sold out, with sales better than ever. Sixty per cent. ahead of last year. Customers calling for 1914 cars just as the 1915 model is to be announced. Is having much difficulty in supplying needs of customers. Has had to call on distributors in surrounding territories to be able to make immediate deliveries on some of the orders.

Car-Nation—Started selling on May 15. Up to date sixty-four cars have been sold. Reports very good outlook for future sales.

Chalmers—Best year it ever had, with a 50 per cent. increase. Fine outlook for 1915 models.

Chandler—June was the largest month it had. Up to July 24 sales have exceeded June. The agency has handled 10 per cent. of the factory output, amounting to 250 cars. The agency has only been going about 11 months.

Ford—Long Island plant reports a 50 per cent. increase.

Hudson—Sold twice as many cars up to July 12, this year, as sold 4 months later in 1913. During 1914 this agency sold 868 cars wholesale, and 146 retail. Increase in sales attributed to the reduction in price on its light six. The agency contracted during 1914 for 298 cars and for the 1915 season, 868 cars.

Hupmobile—During June the local agency has sold and delivered 300 cars to its sub-agents in the surrounding districts, with an increase of about 200 per cent.

Locomobile—Splendid retail sales. One of the best years in the company's history.

Marmon—Has sold fifty-seven cars since March 1, 1914, with prospects good for next season's models. Agency all sold out.

Mercer—Mercer sales are a little above those of last year. This year the agency has made less sales in cars where it has had to take second-hand cars in the trade, than in 1913.

Mitchell—The Mitchell agency reports a 150 per cent. increase. During 1914 300 cars were sold as against 125 in 1913. These 300 were sold during the first half of this year, more than the whole of last year. Predicts good sales for the latter part of 1914.

Moon—From January to June of this year, this agency has sold 182 cars, an increase of 41 per cent. over last year's sales for the same period.

Oldsmobile—Gain approximately 15 per cent. in its sales. Sold 185 cars in 1913 and 215 in 1914. Has sixty orders on the 1915 model. Has contracted for 850 cars of the 4-cylinder type for the coming year and 250 of the sixes. Predicts big year on the fours.

Overland, Peerless, Willys-Knight—Sales 33 1-3 per cent. ahead of 1913. Has ordered 3,500 cars for next year. Last of 1914 Overlands sold.

Packard—Sold out in May on 1914 models. Same sales as made in 1913. Ahead on truck orders. Sales on trucks up to July, 1914, more than any other year.

Premier, Briscoe, Lexington, Pathfinder, Ford—This agency reports good business. Though only in business for a few months sales have been very satisfactory.

Pullman—Sold seventy-five cars first 6 months of this year a 25 per cent. increase. Good sales on 1915 model.

Simplex—Same as last year. Sales on new models very good.

Stevens-Duryea—Up to May 12, 1914, sold as many as up to August 1, 1913. Better this year than ever. Especially good sales in closed cars.

S. G. V.—Increase of 10 1-2 per cent. on 1914 cars. Good 1915 prospects.

Studebaker—Good sales for 1914. Fine prospects for 1915.

Stutz—1914 sales were much better than 1913.

Velie—From August 1 to July, 100 per cent. ahead of 1913. Sold 150 cars in 1914 and seventy-five in 1913. The truck end of business very good.

White—Sales show a very satisfactory increase over last year.

PONTIAC, MICH., Aug. 1—C. E. Voorhis has resigned as assistant general manager of the Kingman Plow Co., Peoria, Ill., to become assistant sales manager of the Oakland Motor Car Co., Pontiac, Mich.

In business is in prospect for 1915. Many important decisions were reached at the conference, among which was the increase in the car prices

Ohio Trade Gets Cut Rates for Compensation Insurance

Premium of 65 Cents Per $100 for Factory Workers Reduced to 60 Cents—For Chauffeurs, from $1.65 to $1.49

COLUMBUS, OHIO, Aug. 3—The Ohio Board of Awards, which has charge of the administration of the workmen's compensation law, made a number of reductions in the premium rates to be charged employers July 1. In this list, which was on the average of 5 per cent., the automobile industry benefited to a large degree. As a result thousands of dollars will be saved employers of men in garages, repair shops, taxicab companies and plants and branches.

The old rate of $1.65 per $100 of the payroll for chauffeurs has been reduced to $1.49. The old rate of 75 cents for all garage employees has been changed to 65 cents, and the old rate of 65 cents for employees of automobile plants and branches has been reduced to 60 cents.

With the law in force for a little more than two years the great benefits to be derived, not only by the employees but also the employer, are plainly seen. While there are a number of things to be adjusted the administration of the law on the whole has been very successful.

The law makes it compulsory for all employers, if firm, individual or corporation which employs five or more persons, to contribute to the state fund. Concerns employing less than five persons can come in if they wish. Those who do not want to come in are compelled to file a bond with the Ohio State Board of Awards and to make all settlements for deaths and injuries on the basis followed by the board.

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Packard Dealers in Session This Week

DETROIT, MICH., Aug. 1—The Packard Motor Car Co. will hold a special "Sales Session," August 5 to 7, when over 100 dealers and sales managers from 60 cities will come to the Detroit plant. Assistant sales-manager A. E. Corbin, will speak about the changes made in the new model "3-38"; the heads of the different departments will give instructive talks and there will be a general discussion of sales problems and Packard methods of manufacture. Finally each dealer will receive his "3-38" demonstrator and will return to his home town in the car, some already having advised the Packard company that they will make a non-stop return trip.

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Briggs-Detroiter Convention Optimistic

DETROIT, MICH., Aug. 1—The annual distributors' convention of the Briggs-Detroiter Co., which was held this week was attended by its principal distributors in the United States, Canada and foreign countries. All seemed very optimistic about the future outlook of the automobile business and greatly pleased with the 1915 Detroiter.

President C. S. Briggs, who presided over the out-door convention which was held under a big tent on the factory's testing grounds, announced that the output for 1915 will be at least double that of this year, the price remaining the same.

There were informal talks about all matters partaining to the Briggs selling, advertising, service and factory policies and an interchange of ideas and suggestions by the distributors.

One of the features of the convention was the presenting by the Briggs-Detroiter company to "Bob" Overstreet, of Ft. Worth, Tex., of the silver bowl and $500 in gold coins which had been put up as prizes to the distributors who disposed of the largest number of cars between May 1 and July 27. Minneapolis and Omaha were respectively second and third in the competition.

The convention ended with a banquet tendered by President C. S. Briggs to the distributors at the Detroit Boat Club.

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Walpole Creditors Get 4 Per Cent. More

BOSTON, MASS., Aug. 3—An additional dividend of four per cent. has been ordered by the United States District Court in Boston for the creditors of the Walpole Tire & Rubber Co. Fifty thousand dollars has been set aside for this purpose. This makes $171,000 thus far paid.

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Willman, Studebaker Advertising Chief

DETROIT, MICH., Aug. 1—George L. Willman, who was assistant advertising manager when William S. Pettit was in charge of the advertising department of the Studebaker Corp., has been appointed manager of this department, while Paul Hale Bruske, who had charge of it after Mr. Pettit's departure, will devote all his time to his work as manager of the publicity department and editor of the Studebaker News. Mr. Willman was most recently connected with the Detroit Board of Commerce as its business manager.

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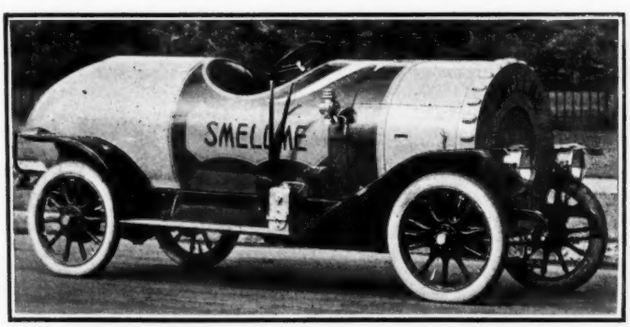
Delivery Cars Built Like Product

DETROIT, MICH., Aug. 1—The First French Perfumery Co., 931 East Jefferson avenue, Detroit, a new concern, has hit upon a clever scheme to advertise its product. The trade mark of its perfume is Smellme and the perfume itself is principally sold in metal cartridges. Two cars have been built with special metal bodies having exactly the shape of the little perfume cartridges, and bearing on both sides the trade name of the perfume. The rear part of the car is used to carry packages just as a delivery car.

The two cars left Detroit a month ago and all the large central and western cities will be visited. The cars attracted a great deal of attention on the streets of Detroit.



Novel advertising scheme devised by a Detroit perfumery company

Gathering of Hupmobile dealers during the recent convention at the factory of the company in Detroit. The meeting lasted 3 days

Klaxon Co. Sues Sparton Dealer

General Automobile Supply Company, New York City, Is Defendant—Action Due To New Patent

NEW YORK CITY, August 4—The United States Patent Office has recently issued to the Lovell-McConnell Mfg. Co., of Newark, N. J., maker of Klaxon, Klaxonet and Klaxet warning signals, patent No. 1,105,324, on application filed July 10, 1911. The claims of this patent cover the motor case with screw-thread and locking-ring adjustment, which the Klaxon company states is an important feature of all Spartan horns now on the market and of the Sparks patent No. 1,048,436, granted December 24, 1912, under which they are marketed.

It is claimed by the Lovell-McConnell Mfg. Co. that the application on which the present patent was granted was filed 10 months before Sparks filed his application. Lovell-McConnell has brought suit in the Federal Court for the Southern District of New York for infringement of this patent against the General Automobile Supply Co., a New York dealer in Sparton horns.

Newtone Maker Is Defendant with Dealer

NEW YORK CITY, July 30—Judge Veeder in the Federal Court for the Eastern District of New York has signed an order making the Automobile Supply Mfg. Co., Brooklyn, N. Y., the Newtone horn manufacturer, a party defendant in the suit brought by the Lovell-McConnell Mfg. Co., the Klaxon horn manufacturer, against Julius Bindrim, a Brooklyn dealer in automobile supplies, selling Newtone and Newtone Superior horns. The Klaxon maker claims infringement of letters patent No. 1,094,403, granted April 21, 1914. This patent was described in THE AUTOMOBILE for July 16, 1914. The plaintiff claims that the Newtone Superior horn is an infringement.

Royalty of 50 Cents on Master Vibrators

NEW YORK CITY, Aug. 4—The motion of the K-W Ignition Co., Cleveland, O., for a new appeal in the suit brought by the Unit Coil Co., Jersey City, N. J., has been denied by the United States Circuit Court of Appeals in Ohio. The Unit Coil Co. charged infringement of the Willard E. Dow patent, No. 752,384, dated February 16, 1904, for an electrical igniter for explosive engines, and the Reuben Willard, Jr., patent, No. 754,666, dated March 15, 1904, for induction coil.

The defendant was ordered to pay a royalty of 50 cents on each one of its master vibrators manufactured since March 1, 1912, and to continue this payment, the injunction against manufacture not to take effect if this condition is complied with.

Norwalk Agency Claims Territory Invasion

NEW YORK CITY, Aug. 3—The Norwalk Motor Car Co. of New York has brought suit in the United States District Court in New York city asking that the Norwalk Motor Car Co., of Martinsburg, West Va., be restrained from shipping Norwalk cars into the New York city territory. The New York Norwalk company had a distributor's contract which the manufacturer determined to terminate because of alleged violations of the agreement. The matter will be heard September 8.

Sue Grand Rapids Truck Stockholders

GRAND RAPIDS, MICH., Aug. 1—For the purpose of trying to recover more than $100,000 for the creditors of the bankrupt Grand Rapids Motor Truck Co., suit in chancery has been filed against 64 stockholders of the defunct concern by the Grand Rapids Trust Co., trustee. The trust company claims that this sum is due on capital stock issued and it also holds that the unpaid balance upon the capital stock which was contracted for, subscribed for or owned by any of the stockholders made defendant, and which balance amounts to the difference between the par value of the stock and the amount actually paid thereon, constitute an equitable asset which is liable and should go for payment to the creditors.

Refinancing for U. S. L. Co.

BUFFALO, N. Y., Aug. 3—Plans are under way for the refinancing of the United States Light & Heating Co., Niagara Falls, N. Y., which recently was placed in the hands of receivers in equity. A H. Ackerman, vice-president and general manager prior to the receivership, has been made general manager under the receivership. Assets are said to be three times the liabilities.

235 Studebaker Dealers Drive from Factory

DETROIT, MICH., July 31—It was Studebaker "Drive Away Day" Wednesday, July 29, when 235 automobile dealers from the Chicago territory who had arrived here in a special train of 12 Pullman cars in the morning, drove out in the afternoon headed for Chicago and many other Western towns in their brand new Studebaker 1915 demonstrators.

"Drive Away Day," the third which the Studebaker Corp. has arranged thus far this season, was the biggest in the history of that concern.

In the party which left Chicago on the special train were dealers from Illinois, Indiana, Iowa and Wisconsin, some located 1,000 miles from Detroit. A stop was made at South Bend, Ind., where the visitors made a tour of the various

Studebaker plants. The train reached Detroit early Wednesday morning and after breakfasting the dealers went to plant No. 1 on Piquette avenue, where the 235 new Studebaker cars were turned over to the 235 dealers who started in the the cars for Clark park. A pathfinding car took the lead on the 300-mile journey to Chicago, while a car carrying a supply of tires ended the procession.

The dealers had been asked to keep in line until South Bend, or 170 miles out of Detroit, and this they did and thus caused the country people along the route to line the roadway and remain wondering at the unusually long procession of brand new cars.

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Orders Multiplied at Hupp Meeting

DETROIT, MICH., Aug. 1—The 3-day dealers' convention of the Hupp Motor Car Company came to a close Friday night when the 200 dealers and officials of the company actually inaugurated the 1915 Hupmobile business, beginning in the shape of a banquet at the Hotel Ponchartrain.

"With double the number of dealers from all over the United States and Canada in attendance and orders on hand for more Hupp cars than ever before in our history," said President J. Walter Drake, "we have every right to call this the most successful Hupp convention. As we expected, the new 1915 Hupmobile was enthusiastically received by every dealer at the meeting, so much so, that every one of them has doubled and in some cases trebled their requirements for 1915. Dealers generally report very favorably on the financial situation, both in the United States and Canada, and they are looking forward to a big year for the automobile industry. Although none of our foreign dealers were in attendance at this meeting, our foreign sales continue as one of the most important factors in our business, and we are planning a record number of shipments abroad during 1915."

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Lozier Opens $100 Photograph Contest

DETROIT, MICH., August 4—The Lozier Motor Co. has promoted a photograph contest open to all with cash prizes totaling $100 of which $50 will be the first prize, $20 the second prize, while there will be three cash prizes of $5, one of $4, one of $3 and four of $2 each. The photographs must be relative to the Lozier light four and should be as much as possible live pictures showing the car at work or at play, at the seashore or in the mountains, climbing, speeding or going through the mud, in fact any picture which makes the car appear in motion. All photos should be addressed to the advertising department of the company which they must reach not later than August 25.

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TORONTO, Aug. 1—Dodge Brothers, Detroit, have appointed E. P. Clarkson as their district representative for this territory.

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DETROIT, MICH., Aug. 1—The Knight Tire & Rubber Co., of Canton, O., has taken over the Detroit agency and changed it into a branch. The headquarters are at 580 Woodward avenue and Fred Harrington is the manager.

Mulford Stars at Galveston Beach

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Drives His Peugeot to Victory in 10 Out of 16 Events at 85 to 110 M. P. H.

GALVESTON, TEX., Aug. 4—*Special Telegram*—Ralph Mulford, whipping his big French Peugeot about the beach race course at a speed of from 85 to 110 miles per hour was the hero of the Galveston Beach races this year. Out of the sixteen events Mulford took first money in ten. He lost but one event entered and in this he was second.

His rivals for honors and money were Alley and Rickenbacher, both of whom drove big Duesenbergs and at many times pressed the winner so hard that the excitement was thrilling. In the first 50-mile event Mulford beat Alley by 4 seconds. In the second 50-mile event he outdistanced the Duesenberg by 1 second. Rickenbacher was driving this time. In the last 50-mile race Mulford was winner by 3 minutes. The big Peugeot's time for the 150 miles, originally called the cotton carnival sweepstake race and later divided into three different events, was 138 minutes and 15 seconds.

Lecain, Tipans, Jessop, Jones and Chandler pulled down money at the races.

Thursday, July 30

Event	Car	Driver	Time
10 miles	Locain	Chevrolet	10:44
	Melaun	Studebaker	11:40
10 miles	Mulford	Peugeot	7:57
	Alley	Duesenberg	8:05
50 miles	Mulford	Peugeot	39:44
	Alley	Duesenberg	39:48
	Rickenbacher	Duesenberg	43:00

Friday, July 31

10 miles	Lecain	Chevrolet	11:12
	O'Donnell	Duesenberg	11:13
10 miles	Mulford	Peugeot	9:526
	Alley	Duesenberg	9:538
	Chandler	Braender Bulldog	9:578
	Handicap.		
15 miles	Mulford	Peugeot	15:00
	Alley	Duesenberg	15:02
	Chandler	Braender Bulldog	15:13

Saturday, August 1

5 miles	Mulford	Peugeot	3:596
	Rickenbacher	Duesenberg	4:006
10 miles	Rickenbacher	Dueesnberg	11:49
	Tippans	———	11:51
20 miles	Mulford	Peugeot	19:264
	Rickenbacher	Duesenberg	19:30

Monday, August 3

15 miles	Mulford	Peugeot	15:256
	Alley	Duesenberg	15:266
	Rickenbacher	Duesenberg	15:296
	Handicap.		
10 miles	Mulford	Peugeot	10:352
	Alley	Duesenberg	10:526
50 miles	Mulford	Peugeot	45:296
	Alley	Duesenberg	50:288

1915 Studebaker demonstrators which were driven from Detroit factory by 235 dealers

Three Mercers Swell Elgin Entries to 17

Concern Felt for De Palma, En Route from Germany — Practice This Week

CHICAGO, ILL., Aug. 3—Three Mercers have been added to the entry list of the Elgin road races, scheduled for August 21-22, bringing the total number of cars engaged to date to seventeen. Two of the Mercers come from the company direct, the drivers nominated being Spencer Wishart and Ed. Pullen, while the third is nominated by Ed. Schillo, the local Mercer agent, who has engaged Charles W. Luttrell, of Chicago, as pilot.

A change of entry also was made the latter part of last week. W. H. Harris, inventor of the Harris drive, which does away with the differential, has bought one of the Marmons belonging to Charles E. Erbstein, the Chicago lawyer and has taken over the entry. Mel Stringer will drive this. The seventeen, which are entered for both days, are as follows:

CAR	ENTRANT	DRIVER
Peugeot	E. J. Schroeder	Not named
Stutz	Stutz Motor Car Co.	Oldfield
Stutz	Stutz Motor Car Co.	Anderson
Sunbeam	W. Ziegler, Jr.	Grant
Sunbeam	W. Ziegler, Jr.	Babcock
Peugeot	L. C. Erbes	Burman
Marmon	C. E. Erbstein	Heinemann
Duesenberg	F. Duesenberg	Rickenbacher
Mercedes	E. C. Patterson	De Palma
Stutz	W. Ziegler, Jr.	Dearborn
Braender Bulldog	Braender Tire & Rubber Co.	Chandler
Duesenberg	F. Duesenberg	Not named
Marmon	W. H. Harris	Stringer
Tahis	F. Robinson	Roberts
Mercer	Mercer Automobile Co.	Wishart
Mercer	Mercer Automobile Co.	Pullen
Mercer	Ed Schillo	Luttrell

Considerable anxiety is felt over De Palma. He was scheduled to sail from a German port last Wednesday, bringing with him the Grand Prix Mercedes. He cabled Tuesday he was to get away the next day, but it is not known whether or not his steamer was one of those recalled by wireless after the war broke out.

The Kane county course is being put in the best of shape. Already it has been oiled once and the second coat will be put on this week. It is expected that informal practice will start the latter part of the week.

Labor Day Matinee for Brighton Beach

NEW YORK CITY, Aug. 3—The Motor Dealers' Contest Assn. of New York city, at a meeting this week decided to hold a matinee race meet at the Brighton Beach track Labor Day, September 7. It is hoped to secure as entries a number of the drivers in the Elgin races, August 21 and 22. George H. Robertson is chairman of the racing committee and will receive entry blanks at 1789 Broadway.

Creosote Blocks for Minneapolis Speedway

ST. PAUL, MINN., Aug. 3—The Minnesota Motor Speedway Assn. has incorporated at $1,000,000 paying a filing fee to the secretary of state of $525. The speedway is to be built between the Twin Cities. Those promoting the scheme for a 2-mile motor course are W. T. Ansley of Minneapolis, W. F. Pascle and E. H. Ehrhorn, Chicago. The promoters report they will have the motordrome ready for races next year.

Cincinnati Speedway Project Chartered

CINCINNATI, O., Aug. 4—This is the latest city to have hopes of a motor speedway. The Cincinnati Motor Speedway Co. has been incorporated at $100,000 for the purpose. The incorporators are W. T Foley, F. D. Hirst, T. A. Tauwald, Jr., C. A. Gintor and A. H. Morrill.

Races and Run for Argentine Republic

BUENOS AIRES, ARGENTINA, July 31—Argentina has so far afforded the best South American market for European automobiles, showing that much may be done to expand American sales in her territory. It is therefore of commercial interest that the Automobile Club of Argentina has decided to hold its annual grand prize run from January 3 to 10, 1915, over the course Buenos Aires—Rosario—Cordoba and return, which represents a distance of 1,700 kilometers (1,060 miles). The going will be treated as a reliability run and the return as a race. Entries at $30 per car can be made until October 15 and at $50 up to December 15. The event is open for all cars and nations without power limit, but each vehicle must be fully equipped and carry two persons. January 7 will be given over to an excursion from Cordoba. On January 8 there will be a 1 kilometer championship race, on January 9 a race from Cordoba to Rosario, 450 kilometers, continued by another race on January 10 from Rosario to Buenos Aires, also 450 kilometers.

37 in 2-Day Ohio Reliability

COLUMBUS, O., Aug. 3—The reliability contest held under the auspices of the *Ohio State Journal*, of Columbus, O., July 30 and 31, was a success in every particular. In all thirty-seven cars started the contest from the office of the newspaper and all but one car finished the tour. The route lay through the principal cities and towns in the central part of the state as follows: Newark, Lancaster, Circleville, Washington C. H., London, Springfield, Mechanicsburg, Marysville, Marion, Mt. Vernon, Delaware and back to Columbus.

Officials and members of the Columbus Automobile Club acted as starters and checkers. Fred Boyd, in a Cole, acted as pacemaker. In all there were four classes in which prizes of cups were given to the first and second.

The winners were: Owners' Class—G. A. Wilson, London, Buick, first, and Fred C. Myers, Columbus, Great Eagle, second.

Dealers' Class, division A, cars selling under $1,250: Kaiser Motor Car company, Hupmobile, first, and The Ohio Auto Sales company, Regal, second.

Division B, cars selling from $1,251 to $2,000—Brasher Motor Car company, Cole, first, and the Standard Motor Car company, Hudson, and The Tywman Motor Car company, Interstate, tied for second place. Both contestants waived their rights to the cup which was awarded to Miss Mable Kinkead, who drove a Hudson throughout the tour.

Division C, cars selling for more than $2,000—F. E. Jolly, Pilot, first, and E. J. Thornton, Winton, second.

New Traffic Rules in Washington Aug. 10

WASHINGTON, D. C., Aug. 3—One week from today many important changes in the traffic regulations will go into effect in this city. One of the most important of the new rules is that no vehicle, except a commercial vehicle, loading or unloading, shall stand for more than 15 minutes at any place on Fourteenth and Fifteenth streets, between Pennsylvania avenue and I street, the most congested section in Washington, between the hours of 8 in the morning and 6 at night. Exception is made of government vehicles.

Another important regulation is that every horse-drawn vehicle shall have a metal tag so affixed on the right side as to be visible 20 feet. A charge of 50 cents is to be made for each tag. No vehicle horse drawn or motor propelled will be allowed to approach within 15 feet of any street car while the same is stopped or stopping for the purpose of taking on or unloading passengers, nor within such distance of the place where a passenger shall have left the street car until the passenger shall have reached a place of safety. Vehicles moving north or south will have right of way over those moving east or west.

The regulations also prohibit the use of a motor muffler cut-out as well as unnecessary or excessive smoke. Electric or acetylene headlights are prohibited on the streets unless the rear reflectors are removed or the front glass is either ground or covered with some material of sufficient density to prevent dazzling or blinding to persons using the streets.

The new regulations expressly set forth that pedestrians should avoid interference with traffic and to this end should not step from the sidewalk without first looking to see what is approaching. They are further admonished to cross the street at a right angle, preferably at a regular crossing at the end of a block and, where a traffic policeman is stationed, wait for his signal. Under the old law, which has never been enforced, pedestrians were compelled to cross a street at a regular crossing, but under the new regulations it is optional where they cross, although the regulations ask pedestrians to use the regular crossings instead of crossing at any point.

There are 80 sections in the new regulations and nearly all of them apply to motorists. Violations call for fines ranging from $1 to $40 for each offense.

Factory Miscellany

AUTO Body Co. Adds—The Auto Body Co., North Lansing, Mich., has started work on the large addition to its factory building, a full force of men being at work excavating on Turner street where the new structure is to be built. When completed the addition will be flush with Turner street on the north and will be 60 feet wide by 140 feet long with an "L" on it 65 feet by 110 feet. It will be three stories high, built of brick and fully equipped with new machinery. The total ground area of the entire factory building will cover nearly two acres in the heart of North Lansing, when the new addition is completed. The company has over 400 men on its pay roll at the present time. In order to supply the factory orders a night shift consisting of men who labor in those divisions of the factory that are back in their work, has been put on.

Faultless Rubber Builds—The Faultless Rubber Co., Ashland, O., will build a three-story 80 by 120-foot factory.

Will Rebuild Havers Plant—Plans are being prepared for the rebuilding of the plant of the Havers Motor Car Co., Port Huron, Mich. The loss to the plant and equipment has been computed at $125,000.

West Lorne Motors Equipping—The West Lorne Motors Co., West Lorne, Ont., contemplates the purchase of some new equipment for the manufacture of automobiles and motor fire trucks and engines. H. A. Carmichael is manager.

Wilson Plant Nearly Completed—New plant of Wilson Tire & Rubber Co., in Harvard Park, Springfield, Ill., will be under cover within 4 weeks. Machinery will have been placed by the middle of September. The main building is 200 by 300 feet and is in the form of a hollow square, having an interior court of 100 by 200 feet.

Sphinx Co. May Soon Operate—At a recent meeting of the Sphinx Motor Car Co., held in York, Pa., plans were discussed for the beginning of operations of the new company. The several sites offered to the company for the location of its plant were discussed in detail, but no definite action was taken in the matter. Offers of real estate have been received from York, Lancaster and Reading. The new company sustained the loss of all its blue prints, drawings and specifications in the fire at the body plant of Charles K. Darone & Co. The latter concern had been awarded the contract to build the first twenty-five Sphinx bodies. The Sphinx company is capitalized at $160,000.

Ford Service Building for Fargo—Ford sales agencies in North and South Dakota and Montana will be served from a large assembling and distributing plant which is to be built at Fargo, N. D., within the next few months, according to an authoritative announcement made there this week. It is definitely stated that that branch will employ a force of about 300 men and that all Ford cars sold in the Northwestern States will be assembled there, the parts being shipped from the factory at Detroit. The site for the new plant is 120 by 150 feet, and, although the details of the plans are not known, it is said that the building is to occupy the entire site and will be three or four stories in height, making it one of the largest Ford branches in the country.

New Bosch Service Stations—The Bosch Magneto Co., New York City, has recently added to its list the following supply stations: Pollard Auto Co., 232 Main St., Nashua, N. H., J. F. Charlev Auto Co., Evansville, Ind., Weeks Garage, Patchogue, N. Y., C. A. Gossard Auto Co., 122-124 S. Fayette St., Washington C. H., O., Harnell Garage, Babylon, N. Y., N. J. Auto & Supply Co., 38 N. Delaware Ave., Camden, N. J., Reilly Bros. & Raub, 44-46 No. Queen St., Lancaster, Pa., Central Auto & Supply Co., Jackson, Mich., Le Jeal Cycle & Mobile Works, 1721-1723 Sassafras St., Erie, Pa., Shrive Incorporated, 64 Warburton Ave., Yonkers, N. Y., S. H. Heginbottom & Son, Saginaw, Mich., Mattoon Motor Car Co., Mattoon, Ill., Eric J. Gustafson, Rockford, Ill., Ward's Vulcanizing Works, 27 So. Main St., Concord, N. H., Lawrenceville Auto Co., Lawrenceville, Ill., W. A. Sanford, 52 No. Main St., So. Norwalk, Conn., Cadillac Motor Car Co., 202 Government St., Mobile, Ala., Rippowam Garage, Stamford, Conn., and the Gibbes Machinery Co., Columbia, S. C.

Thomas Car Nearly Completed—The Thomas car of Saginaw, which Lansing builders are making is under construction at the plant of the Acme Engine Co., North Lansing, Mich. All parts of the car have been made and the assembling process is under way. The car will be on the streets about August 16. If it meets expectations, a plant will be established here for its manufacture. W. H. Porter, L. E. Rowley and a number of other prominent local men are interested in the project.

For a small car it is unique in design, having a stream-line body, pointed radiator, electric lights, left steer and center control. It will have four cylinders, water cooled with a thermo-syphon system and 18 horsepower. The rear axle will be a gearless differential and the car will have a shaft drive, sliding gear transmission, with three speeds forward and one reverse. A commodious tail box in the rear will carry all necessary equipment needed on a trip of any distance. Other specifications are a 28-inch wooden wheel, with a 3-inch tire; two side lights, a large head light in front of the radiator; motor 2¾ inch bore by 4-inch stroke.

The Automobile Calendar

Aug. 2-9	Grenoble, Automobile Club of France's 6-Day Motorcycle and Cyclecar Reliability Contest in French Alps.
Aug. 16	Le Mans, France, Automobile Club de la Sarthe's Coupé International Light-Car Race, 1 liter, 400 maximum cylinder area, 350-500 kilos weight.
Aug. 17	Le Mans, France, Auto Club de la Sarthe's Grand Prize de France for 4½ liter cars.
Aug. 21-22	Chicago, Ill., Elgin Road Races, Chicago Automobile Club.
Aug. 23	Auvergne, France, Coupé de l'Auto Race.
Aug. 27	Brooklands Track, England; Annual Automobile Race.
Aug.	Denver, Colo., 650-mile Run, Colorado Springs to Salt Lake City.
Aug.	Russia, Road Race, Coupe de l'Empereur, 2,500 miles.
Sept. 6-7	Brescia, Italy, Auto Club of Italy's 4½-liter Grand Prize.
Sept. 6-7-8	Newark, N. J., Cyclecar Reliability Tour to Atlantic City.
Sept. 7-14	Indianapolis, Ind., Automobile Show, Indianapolis Automobile Trade Assn.
Sept. 9	Corona, Cal., Road Race, Corona Auto Assn.
Sept. 10	Portsmouth, Eng., Autumn Conference, Institute of Metals.
Sept. 10-15	Berlin, Germany, German 4½-liter race.
Sept. 15-Oct. 11	New York City, Commercial Tercentenary Celebration.
Sept. 26	Brooklands Track, England, Annual Automobile Race.
Sept. 26-Oct. 6	Berlin, Germany, Automobile Show.
Oct.	Philadelphia, Pa., E. V. A. A. Annual Convention.
Oct. 4	St. Louis, Mo., Automobile Show, Auto Manufacturers' and Dealers' Assn.
Oct. 7-17	New York City Electric Vehicle Show, Grand Central Palace.
Oct. 9-Nov. 2	S. A. E. European Trip.
Oct. 16-26	Paris, France, Automobile Salon.
Oct. 17-24	Pittsburgh, Pa., Automobile Show, Auto Dealers Assn., Inc.
Oct. 19, 20, 21	Philadelphia, Pa., Elec. Veh. Assn.'s Convention.
Oct. 19-26	Atlanta, Ga., American Road Congress of the American Highway Assn. and the A. A. A.
Oct. 28-31	Milwaukee, Wis., Convention, Northwestern Road Congress, Auditorium.
Nov.	El Paso, Tex., Phoenix Road Race, El Paso Auto Club.
Nov. 6-14	London, England; Olympia Show.
Nov. 8-9	El Paso to Phoenix, Ariz., Automobile Race.
Nov. 8-11	Shreveport, La., Track Meet, Shreveport Auto Club.
Nov. 15	Paris, France, Kerosene Motor Competition.
Jan. 2-9	New York City, Annual Automobile Show, Grand Central Palace.
Jan. 23-30	Chicago, Ill., Automobile Show, First Regiment Armory.

The Week in the Industry

Motor Men in New Roles

PYKE Now in Charge—Harry N. Pyke assumed charge of the Boston branch of the Chalmers Motor Car Co. on August 1, when the Whitten-Gilmore Co. dissolved and relinquished the agency. He had been with the Chalmers Co. for 6 years, the greater part of the time at New York.

Tackerbury Joins Puritan Co.—The Puritan Mfg. Co., Detroit, has appointed W. W. Tackerbury, formerly of the Metal Products Co., as assistant general manager.

Willman Studebaker Advertising Manager—G. L. Willman has been appointed advertising manager of the Studebaker Corp., Detroit, Mich. His duties commenced August 1.

Fern Winton's Vancouver Manager—W. S. Fern, formerly of Spokane, Wash., has recently been appointed sales manager for the Winton Motor Carriage Co., at Vancouver, B. C.

Henshaw on the Sick List—Charles S. Henshaw, sales manager of the Alvan T. Fuller Co., Boston distributors of Packard cars, is just recovering from an operation for appendicitis.

J. H. Ficken in New Position—J. H. Ficken, who recently resigned from the staff of the United States Tire Co., is now on the sales staff of the Kelly Springfield Tire Co., in the New York City territory.

D. Dalton Ohio Automobile Inspector—Daniel Dalton has been appointed automobile inspector of Ohio. His duties will be to travel the state and see that all cars are properly registered and that chauffeurs are licensed.

Sidney P. Bowman to Change Quarters—The Sidney P. Bowman Co. has leased the building at 1710 Broadway, New York City, and will occupy it as an agency for Oakland automobiles as soon as alterations are completed.

Ficken Representing Kelly-Springfield Tire—J. H. Ficken has left the employ of the U. S. Tire Co., Akron, O., where he has been for a number of years, and will in the future represent the Kelly-Springfield Tire Co., in New York City.

J. Doyle Gets Dodge Detroit Branch—J. Doyle, for 6 years manager of the Detroit branch of the Ford Motor Co., and at present distributor for Saxon cars for the state of Michigan, has been selected by Dodge Bros. as their Detroit representative.

Heftler Returns from France—V. R. Heftler, president of the Zenith Carburetor Co., Detroit, Mich., returned on July 25 from a month's trip to France. While on the continent Mr. Heftler attended a gathering of factory heads from the different Zenith carbureter branch factories to discuss the business outlook for 1915 and to hold a general get-together meeting.

Paige Resigns from National—A. J. Paige, M.E., who has been assistant mechanical engineer for the National Motor Vehicle Co., Indianapolis, Ind., for over 3 years, has resigned to devote some time to the development of a new motor of his design.

New Place for Asher—A. I. Asher is having erected a new brick and concrete structure of two stories and basement at the corner of Green and Spruce streets, Worcester, Mass., which he will occupy as a salesroom and service department early this fall.

Flint Jeffery Detroit Representative—The Thos. P. Jeffery Co., Kenosha, Wis., manufacturer of the Jeffery cars, has appointed as its Detroit representative H. J. Flint, formerly manager of the Hupmobile Sales Co., and later with the Oldsmobile agency, of Detroit.

Travis at Locomobile Factory—E. A. Travis, for some time manager of the Boston Locomobile branch, has been appointed assistant sales manager at the factory at Bridgeport, Conn., and A. P. Hawes, of the local branch, has been appointed to fill the vacancy.

First Automobile Show—The first automobile show of the 1915 season will take place at Salem, N. H., during the first week in September, when Chester I. Campbell, manager of all the Boston motor shows, will have charge of a big section set aside at Rockingham Park that week, where dealers in Boston, Lowell, Lawrence, Haverhill, Nashua, Manchester and other New England cities will have a chance to exhibit their new models. It will be an outdoor show.

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Garage and Dealers' Field

Taxicabs in Mt. Vernon—H. M. Ball has started a taxicab and automobile livery business.

Bladensburg, O., Organizes Club—The Bladensburg and Martinsburg Automobile Club was organized recently by twenty-five owners. S. C. Horn was elected president.

New Garage in Cleveland—Plans and specifications have been prepared for a four-story building at the corner of Adams and Thirteenth streets for the Roberts-Toledo Automobile Co. It will be used as a garage and salesroom.

New Garage at Brockton, Mass.—Elbridge W. Anderson, of Brockton, Mass., has had work started on a brick and concrete garage on Beach street that will accommodate 30 cars as well as having space for a repair shop.

Ohio Convicts Build Truck—The state of Ohio is now operating an automobile truck which was built by the convicts in the Ohio Penitentiary. Ohio is the first state in the Union to embark into the automobile business.

Boston Cadillac Agency Moves—The salesrooms of the Cadillac Automobile Co., Boston, Mass., have been moved to the main building, 664 Commonwealth avenue, from where the entire Cadillac business and service is now operated.

Lee Tire Makes a Move—The Boston branch of the Lee Tire and Rubber Company, that has been located at 10 Park Square ever since it was opened in that city a few years ago, has been moved to larger quarters in the Motor Mart near by.

Post Office Trucks in Cleveland—The U. S. Post Office Department has decided to install nine automobile trucks in the parcel post service in Cleveland, O., within the coming month. With this increased equipment the service will be greatly improved.

Maguire Building New Place—J. W. Maguire, Boston agent for the Pierce-Arrow, is building a new service station on the Charles River boulevard in Cambridge between the Ford and Gray & Davis plants. It will be ready for occupancy in a couple of months.

Haynes Co. Branch in San Francisco—The Haynes Automobile Co. has recently established a direct factory branch in San Francisco under the California corporation name of the Haynes Auto Sales Co., Inc., with C. H. Haynes at the head and Fred Hauger sales manager.

Harry Ford's Mission—President Harry Ford, of the Saxon Motor Car Co., is spending some time in Boston to secure a new agency for the Saxon there which was thrown on the market by the dissolution of the Whitten-Gilmore Co. He expects to sign up with a new dealer in a few days.

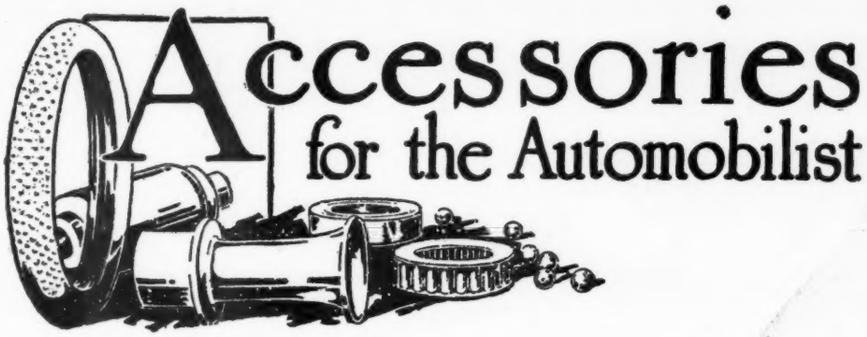
Willard Officers Hold Banquet—T. A. Willard, head of the Willard Storage Battery Co., Cleveland, O., and other officers of the company, tendered a banquet to thirty branch managers gathered from all parts of the country. The visitors spent a day at the plant. These meetings are held every 6 months.

New Cole Additions—A. S. Blakely, identified with the editorial end of the automobile industry, has joined the Cole Motor Car Co., Indianapolis, Ind., and will have charge of the factory publicity department. H. C. Bradfield, previously in charge of the department, has been promoted to field sales representative.

$1,000,000 Building in Montreal—Automobile interests in Montreal, Que., are planning a million-dollar automobile building. The ground floor will likely be used as a garage for members of the Automobile and Aero Club of Canada, while offices on the others floors will be occupied by automobile salesmen, supply firms, etc.

Increasing His Plant—Henry F. Walker, of Medford, Mass., who has the agency for several cars in his city, is building a large service station in the rear of his present establishment, 49 Main street, that will have accommodations for 30 cars in addition to the repair shop. The building is of concrete and will be finished in a few weeks.

Boston Lozier Secures Location—The Leghorn Motor Sales Co., formed in Boston last week to handle the Lozier, has secured salesrooms at 793 Boylston street, and after alterations are completed the company will have its formal opening Monday, August 10, when some of the Lozier factory officials will be present to give the new agency a send-off.



A **ROTARY Valve Motor,** Fig. 1, in which the valve is directly cooled by passing water through it, has been brought out by Henry P. T. Van Kueren, an engineer in the bureau of highways, Philadelphia, Pa. The single rotating valve serves both intake and exhaust ports in turn, the valve being cut away to allow the passage of the gases.

One of the features of the motor is the method by which the pressure on the rotating valve is varied so that when the gases are exploding the valve is held tightly, but on other strokes the pressure is reduced and thus the wear is lessened. This is effected by means of a sleeve between the piston and the cylinder, the upper part of which carries the rotary valve. Thus when an explosion occurs the pressure of the gases on this sleeve holds it tightly against the rotating valve while on the other strokes the pressure in the cylinder is slight and, therefore, the wear on the axle is reduced.

In operating the valve a silent chain is employed, it being driven from the crankshaft and passing over the magneto sprocket and an idler pulley. Thermo-syphon cooling is used.

The motor bore is 4 inches, while the stroke is 4.5. The valve is 2.5 inches in diameter, and its walls are .25 inch thick. The port areas are 3.19 square inches, or 25.4 per cent. of the piston-head area. The bearing surface between cylinder and valve is 6.16 square inches per cylinder. The motor weighs 405 pounds. Five main bearings are used and the crankshaft is 1.5 inches in diameter.

The timing is as follows: Intake opens 2.5 degrees after upper dead center, and closes 26.5 degrees after lower center; the exhaust opens 26 degrees before lower dead center, and closes 2.5 degrees before upper dead center.

Robbins' Ford Bodies—With inclosed passenger car bodies for Ford cars being manufactured by a number of concerns and sold at a comparatively low figure, many owners of these vehicles transform the open car to a closed one at the first sign of cold weather. A line of Ford inclosed bodies is manufactured by Irvin Robbins & Co., Indianapolis, Ind., which consists of three styles, a three-passenger coupe, a four-passenger sedan and a five-passenger sedan. A commercial body is also made. These bodies sell for from $100 to $500, and because of the standard dimensions may be fitted to the Model T chassis in a short time. The Robbins bodies are said to be finished in the best fashion, having double adjusting windshields, dome lights, sashless windows, carpeted floors and many other appointments which will appeal to the owners. The illustrations in Fig. 2 show three passenger car bodies and the commercial body also.

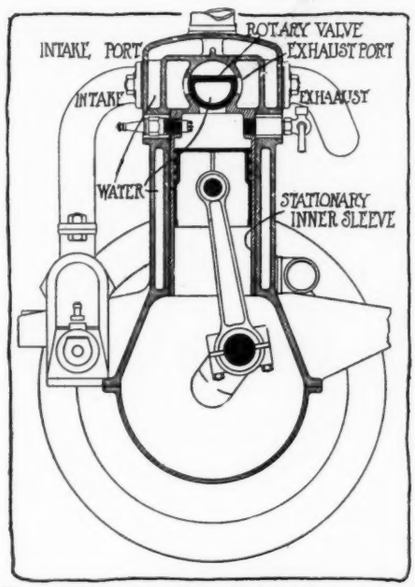


Fig. 1—Van Keuren single-sleeve, rotary valve motor

Lane Pressed-Steel Jack—A pressed-steel jack which is light in weight, compact, easily handled and has no loose parts has been announced by Lane Bros. Co., Poughkeepsie, N. Y. This jack has a pressed-steel frame, a wrought steel lift bar and is made in three sizes—Nos. 5, 6 and 7, which weigh 4¾, 7¼ and 8 pounds respectively. The No. 5 has a capacity of 1,800 pounds and the other two 3,000 pounds, and the prices are $1.50, $2.50 and $2.75. When no weight is on the lift bar it may be dropped by pinching the trip levers without working it down, notch by notch.

Double Rubber Tubes—Inner tubes made of alternate plies of red and grey rubber, the former giving maximum elasticity and imperviousness to the air while the latter adds strength and toughness, are announced by the Double Fabric Tire Co., Auburn, Ind. It is stated that these tubes are 50 per cent. thicker than the ordinary tube. Double rubber tubes vary in price from $3.45 for the 28 by 3 size to $10.85 for the 38 by 5.5.

Gurney Ball Bearing Catalog—The Gurney Ball Bearing Co., Jamestown, N. Y., has just issued a new catalog which is descriptive of its full line of radial, radio-thrust and duplex bearings. Tables of loads and speeds that are permissible are given, and these should prove valuable to all users of ball bearings.

Haynes Dimmer—The Haynes Automobile Co., Kokomo, Ind., has offered a solution to the problem of eliminating the dazzling glare from headlights by the use of two simple devices which will be regular equipment on the new Model 30 light six car. The headlight bulbs are frosted on the upper half only, so that the rays reflected upward are diffused and softened, thus eliminating the objectionable blinding effect on drivers of passing cars in the country. The rays reflected downward through the clear glass of the bulbs are projected straight ahead onto the road.

For congested city driving, a second means is employed. The two headlights are switched into series, which action cuts down the illumination by reducing the voltage across each lamp.

Curtis Equalizing Spring System—In order to keep all four wheels on the ground at all times, Curtis & Glennon, Chicago, have brought out the device shown in Fig. 3, which consists of a beam M flexibly mounted at a point P and attached at the point A to a special shackle and at B to an arm. This arm is attached to a flat coil spring contained in the cylinder, shown, the spring absorbing most of the shock transmitted. When the car rides over rough ground the beam moves vertically and causes the spring in the cylinder to compress. With the Curtis device the frame tends to keep one position and the wheels stick

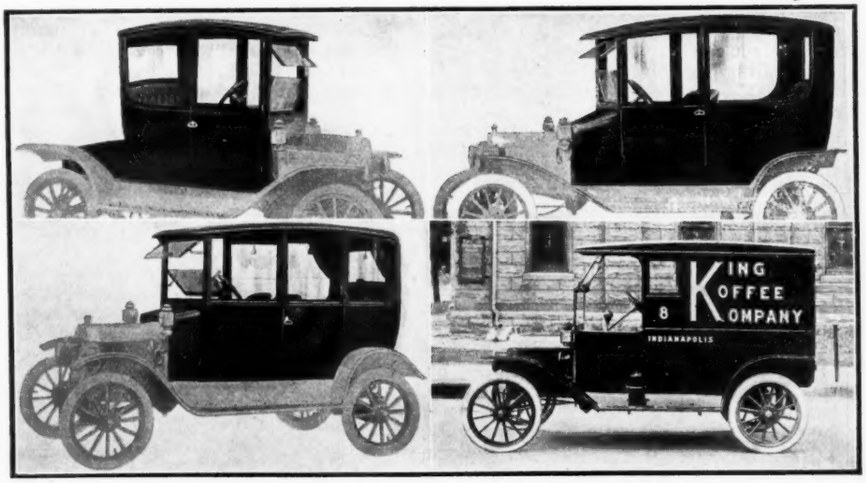


Fig. 2—Four types of bodies made by Robbins & Co., Indianapolis, Ind., for Ford cars

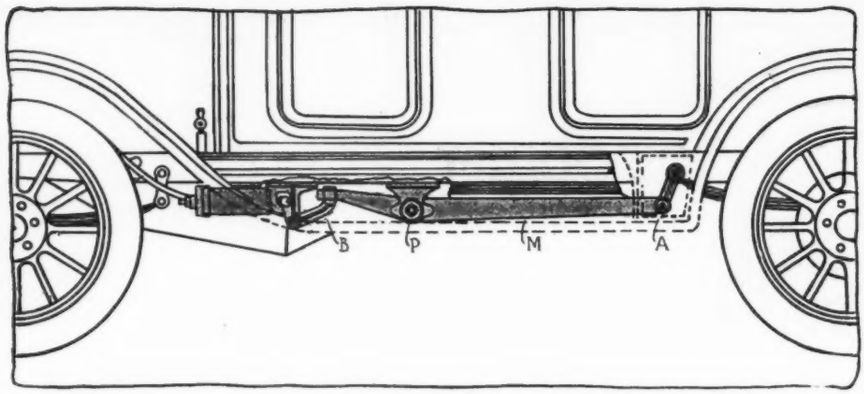


Fig. 3—Curtis equalizing spring system designed to keep the wheels from leaving the ground

to the ground. When demonstrated to an AUTOMOBILE representative the device showed good results on a 1910 Pierce-Arrow, which was driven over exceedingly rough roads at 25 miles per hour without causing the passengers to fly off the seat.

Pyralin Dimmer Goggles—A new type of goggle which is designed to protect the motorist from the blinding rays of strong headlights by darkening the upper half of the goggle is made by the Dimmer Goggle Co., Whiting, Ind. This goggle is made from a substance called pyralin, which is flexible, strong and cheap. The lower part of the goggle is amber color and the upper dark green. In the illustration, Fig. 4, three styles are shown. A having silk edges, B rubber binding, and C is a type designed especially for women.

Simplex Shock Absorber—Front and rear shock absorbers of the helical spring type are made by the Keystone Spring Works, Philadelphia, Pa. Two types are offered, one for Ford cars and another for larger machines. The former sells for $10 per set and the latter, Fig. 5, for $20. All parts are case hardened.

Jiffy-Jax Tire Savers—To prevent the deterioration of the tires due to contact with oil and water on the garage floor the Jiffy-Jack Co., Cleveland, O., has brought out a set of four jacks, Fig. 6, selling for $5, which enable the owner to quickly raise the wheels of the car from the floor. The jacks are applied to the hubs of the wheels and a single movement of the jack lever raises the wheel.

Goodyear S. V. Tire—A feature of the Goodyear S. V. Truck tire is the economy to the truck owner.

The first and most noticeable item is the total absence of steel fastenings of any kind. The first cost on fastenings for a truck tire of the demountable type ranges from $3 to $7 per wheel, and on the old style pressed-on type, the supplemental band may cost from $3 to $9 per wheel. Taking the most popular size tires, this charge for steel equipment represents about ten per cent. of the total cost of the tire, or in other words, the purchase of an S. V. tire can be considered as a ten per cent. reduction in price, it is stated.

The weight of the steel fastenings in the case of a demountable type tire, or the weight of the supplemental band in the old style pressed-on tire is great enough to represent an additional yearly expense of well over a hundred dollars when the cost of carrying it around is estimated at fifteen cents per ton mile. The economy idea is further driven home by the fact that the additional weight referred to is not borne by the springs.

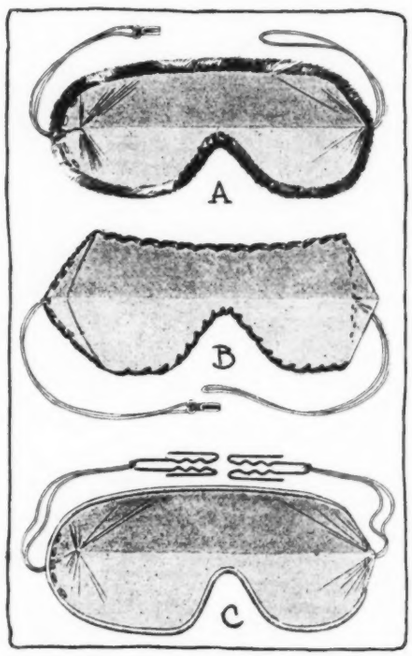


Fig. 4—Three types of Pyralin goggles

Ajax Dimmer—Most of the dimming devices brought out recently are applicable only to electric headlights, but the Ajax, Fig. 7, made by the Wanner Mfg. Co., Chicago, is designed for use on acetylene burning lamps and consists of a disk of dull-finished steel interposed between the burner and the reflector. The disk is fitted to a thumb screw clamp attached to the base of the burner and when it is desired to dim the lamps the thumb screw is loosened and the disk turned so that it lies between the reflector and the gas light. The Ajax sells for $1 per pair.

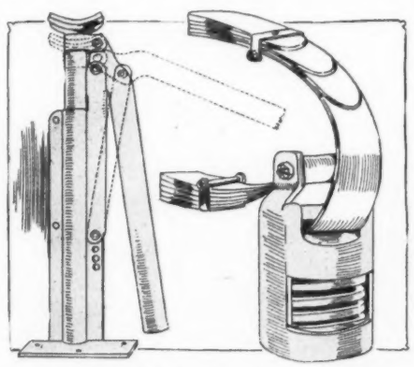


Fig. 5—Right—Simplex shock absorber
Fig. 6—Left—Jiffy-Jax tire savers

Buell Explosion Whistle—A whistle, Fig. 8, made by the Buell Mfg. Co., Chicago, Ill., is installed in the explosion chamber of the motor and utilizes the high pressure of the explosion to blow it, the principle being the same as a steam whistle on a boiler using high-pressure steam. It is generally screwed into one of the unused valve caps, but when a spark plug hole only is available a fitting as shown in the photograph is used to carry both spark plug and whistle valve. Theoretically it is not good practice to lift the spark plug the ¾ inch this fitting does, but in practice the loss is so slight it cannot be noticed. The chief advantages of this whistle are the particularly effective pulsating note it produces, the absolute certainty of its operation, its self-cleaning features due to the high pressure used, and its extreme simplicity and ease of installation.

Compac Tents—The Compac Tent Co., Indianapolis, Ind., is marketing a tent made especially for motorists. The Compac tent forms a simple means of shelter and can be carried around on the runningboard of the car, for it occupies a small space, as shown in Fig. 9. No poles are required for erection and the tent can be set up on either side or at the rear of a car. The floor of the tent is made of the same material as the tent and by stuffing grass, etc., under this floor, the use of ordinary cots is not necessary. Compac tents are made in a variety of materials, the prices ranging from $31.50 for the 7 by 5 foot size to $48.30 for the 7 by 10 foot.

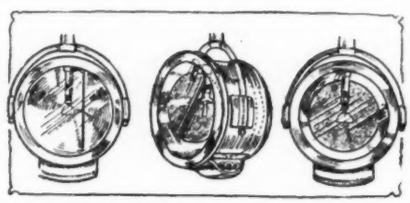


Fig. 7—Ajax dimmer for acetylene headlights

Fig. 8—Buell explosion whistle

Fig. 9—Compac motor tent